

**RCRA Facility Assessment - Sampling
Visit Addendum
for
Naval Weapons Industrial
Reserve Plant
Calverton, New York**



**Northern Division
Naval Facilities Engineering Command**

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**RCRA FACILITY ASSESSMENT - SAMPLING VISIT ADDENDUM
FOR
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK**

**COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

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1.0 INTRODUCTION

1.1 PURPOSE

The Northern Division of the Naval Facilities Engineering Command has issued Contract Task Order (CTO) 0138 to CF Braun Engineering Corporation through a master agreement with Brown and Root Environmental (B&R Environmental), under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract N62472-90-D-1298 to perform a Resource Conservation and Recovery Act (RCRA) Facility Assessment - Sampling Visit (RFA) Addendum for the Naval Weapons Industrial Reserve Plant (NWIRP), located in Calverton, New York.

This work is part of the Navy's Installation Restoration (IR) Program, which is designed to identify contamination of Navy and Marine Corps lands/facilities resulting from past operations and to institute corrective measures, as needed. There are typically four distinct stages. Stage 1 is the Preliminary Assessment (formerly known as the Initial Assessment Study). Stage 2 is a RCRA Facility Assessment - Sampling Visit (RFA) (also referred to as a Site Investigation), which augments the information collected in the Preliminary Assessment. Stage 3 is the RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) (also referred to as a Remedial Investigation/Feasibility Study [RI/FS]), which characterizes the contamination at a facility and develops options for remediation of the site. Stage 4 is the Corrective Action, which results in the control or cleanup of contamination at sites. This report has been prepared under Stage 2 (RFA) and serves as an addendum to the RCRA Facility Assessment - Sampling Visit for Naval Weapons Industrial Reserve Plant Calverton, New York, (HNUS 1995).

This work was conducted in accordance with the requirements of the New York State RCRA Hazardous Waste Permit for the facility (NYSDEC 1-4730-00013/00001-0), dated March 25, 1992. New York State Department of Environmental Conservation (NYSDEC) is the lead oversight agency. This work was also conducted in accordance with the requirements of the United States Environmental Protection Agency (EPA) facility permit (EPA ID Number NYD003995198), dated May 11, 1992. The EPA supports NYSDEC in its oversight activities. The requirements of both permits appear to be the same, although the terminology and format vary.

1.2 FACILITY LOCATION

The sites involved in this study are located within the confines of the Naval Weapons Industrial Reserve Plant (NWIRP) in Calverton, Suffolk County, New York, (see Figures 1-1 and 1-2). The majority of the facility is located within the municipality of Riverhead and a small area on the western side of the facility is located within Brookhaven. NWIRP Calverton is located on Long Island approximately 70 miles east of New York City.

The Calverton Facility used to be a Government-Owned Contractor-Operated (GOCO) facility which was operated by the Northrop Grumman Corporation. The facility has an overall area of approximately 6,000 acres, of which, 3,000 acres lie entirely within a fenced-in boundary. The majority of the industrial activity was confined to the south central portion of this fenced-in area.

1.3 FACILITY HISTORY

NWIRP Calverton has been owned by the United States Navy since the early 1950's, at which time the land was purchased from a number of private owners. The facility was expanded in 1958 through additional purchases of privately-owned land. Northrop Grumman Corporation (previously Grumman Corporation) leased the land and was the sole operator of the facility from its construction until February 1996.

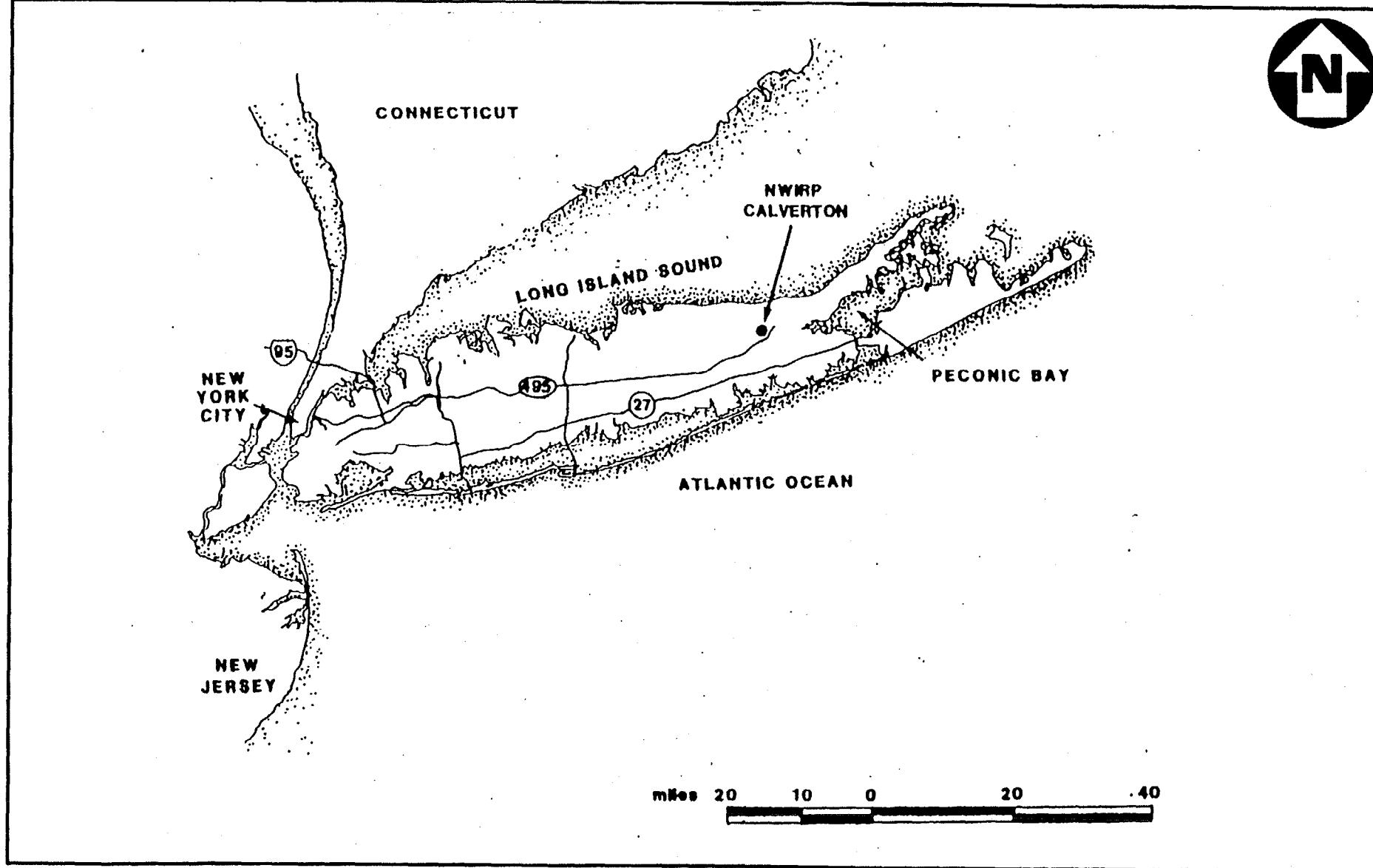
The Calverton facility was constructed in the early 1950's for use in the development, assembly, testing, refitting, and retrofitting of Naval combat aircraft. The facility supported aircraft design and production at the Northrop Grumman's Bethpage facility, which is located in Nassau County, New York.

The majority of industrial activity at the facility was confined to the developed area in the center and south center of the facility, between the two runways. Industrial activities at the facility were related to the manufacturing and assembly of aircraft and aircraft components. Operations which resulted in hazardous waste generation included but not limited to metal finishing processes, such as metal cleaning and electroplating, other maintenance operations, temporary storage of hazardous waste, fueling operations, and various training operations. The painting of aircraft and components resulted in additional waste generation.

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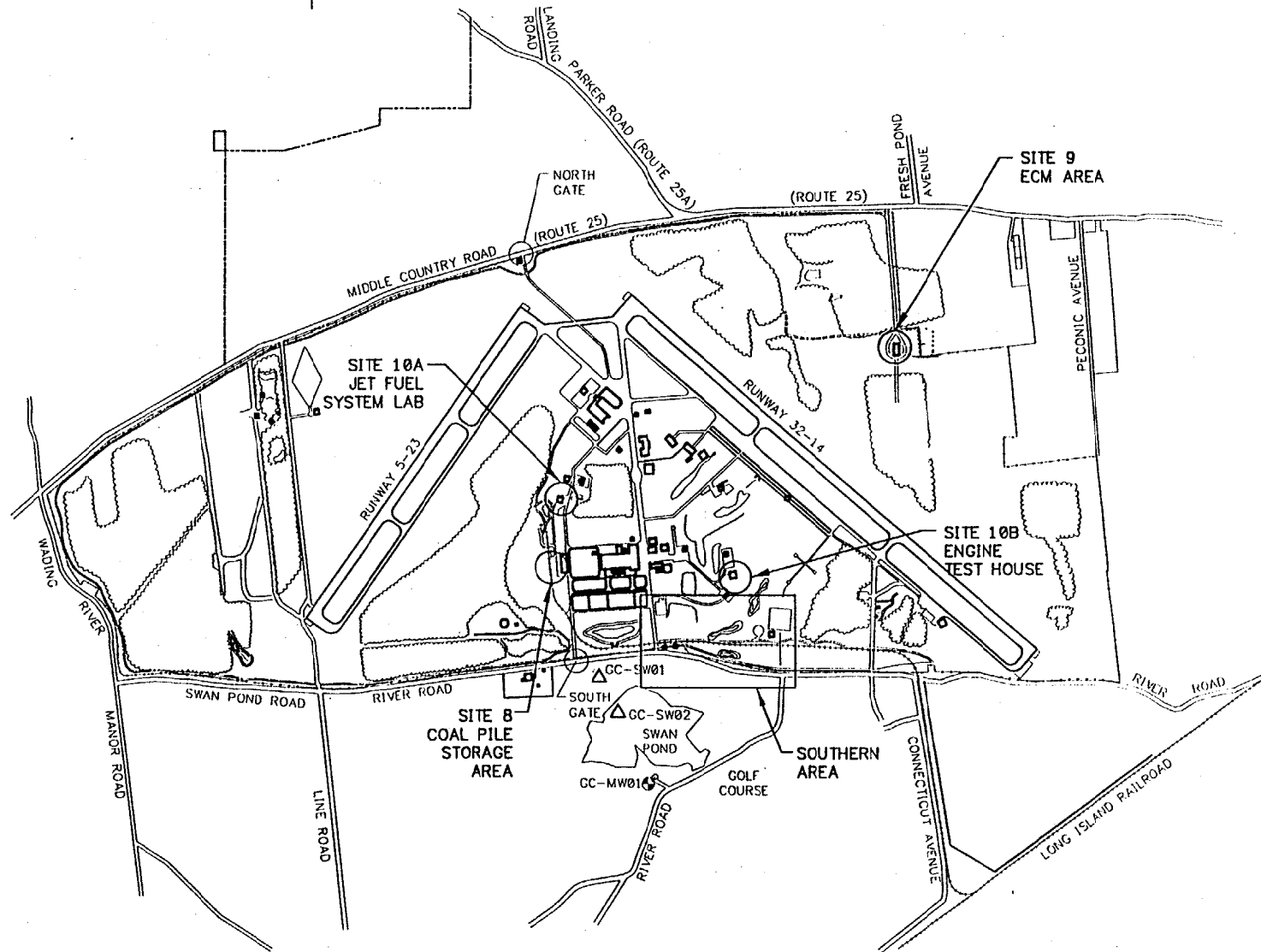
CTO 0138



GENERAL LOCATION MAP
RFA ADDENDUM SAMPLING VISIT
NWIRP, CALVERTON, NEW YORK

FIGURE 1-1

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LEGEND:

TREELINE

 EXISTING GOLF COURSE
PRODUCTION WELL

 PROPOSED GOLF COURSE
SURFACE WATER SAMPLE

LOCATION OF SITES
RFA ADDENDUM SAMPLING VISIT
NWIRP, CALVERTON, NEW YORK

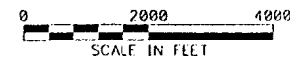


FIGURE 1-2

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1.4 PREVIOUS INVESTIGATIONS

This report has been prepared as an addendum to the NWIRP Calverton RFA - Sampling Visit report issued in March 1995, (HNUS 1995a). The report concluded that additional testing was necessary to confirm the presence or absence of contamination at four of the sites investigated during the initial RFA - Sampling Visit. The general approach for the additional testing was discussed during the fourth Technical Review Committee (TRC) meeting held in June 1995. The exact number, location, and analytes for testing was refined during an internal scoping meeting in August 1995. During this meeting, it was determined that two additional areas should be evaluated. The testing program for all six sites/areas was presented in the RFA - Sampling Visit Work Plan Addendum, (CF Braun 1995).

Five on-site areas and one off-site area were investigated as part of the supplemental RFA. The five on-site areas, which are identified on Figure 1-2, are:

- Site 8 - Coal Pile Storage Area
- Site 9 - ECM Area
- Site 10A - Jet Fuel System Lab
- site 10B - Engine Test House
- Southern Area

The off-site area is a golf course located south and hydraulically downgradient of the facility, (see Figure 1-2). An investigation of the groundwater and surface water on the golf course was conducted to determine if there are any detectable levels of contaminants in these media, and if present, to determine if they present any imminent risks to human health.

1.5 SUMMARY OF FIELD ACTIVITIES

The field activities consisted of a soil boring and temporary monitoring well program followed by the installation and/or testing of select permanent monitoring wells. A total of 32 temporary monitoring wells were installed: 23 at predetermined locations and 9 at locations determined based on the results of the quick turn-around groundwater sampling analyses. In addition, offsite surface water samples were collected. The soils were tested for total petroleum hydrocarbons as an indicator of petroleum products. The groundwater and surface water were tested for volatile organic compounds (VOC).

Details on site-specific history, concerns, previous testing, and current testing are presented in Sections 2.0 through 7.0 and are summarized in Section 1.6.

Sampling rationale: Groundwater contamination was found in a monitoring well located hydraulically downgradient of this area. Upgradient source area investigations, including those at the Site 6A - Fuel Calibration Area, Site 10B - Engine Test House, and an adjacent cesspool/leach field area were not conclusive in identifying the source of this contamination. It should be noted that the chemicals in the monitoring well were also identified in these upgradient sources. Other potential sources of the offsite contamination exist including topographic depressions in the area and the coal road base material.

1.6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLES

The samples were analyzed by Nytest Environmental, Inc. (24-hour turn around time) and RECRA Environmental, Inc. (contractual turn around time). The Nytest data were evaluated based upon laboratory method blank contamination and field quality control blank contamination. The common laboratory contaminants, methylene chloride and 2-butanone, were detected in most samples at maximum concentrations of 8 ug/L and 6 ug/L, respectively. Action levels of 10X the maximum concentrations detected (i.e., 80 ug/L for methylene chloride and 60 ug/L for 2-butanone) were used to evaluate the environmental samples for laboratory blank contamination. A field blank was collected midway through the sampling round due to the presence of the volatile compounds 1,2-dichloroethane and acetone detected in most of the previously collected samples. Laboratory contamination was suspected since acetone is a common laboratory contaminant and 1,2-dichloroethane has not been previously detected at this project site, nor was this compound detected in the samples analyzed by RECRA Environmental, Inc.. These compounds were detected in the field blank at the maximum concentrations of 12 ug/L and 8 ug/L. Action levels of 120 ug/L for acetone (common contaminant) and 40 ug/L for 1,2-dichloroethane were established and applied to all samples. All positive results reported for the aforementioned compounds (methylene chloride, 2-butanone, acetone, and 1,2-dichloroethane) were attributed to blank contamination.

A cursory data validation was used to evaluate the RECRA Environmental data. All samples were analyzed within the technical holding time. No target compounds were detected in the laboratory method blanks. Minor calibration noncompliances were noted, however, these occurrences did not impact the positive and nondetected sample results.

The Nytest sample data and the RECRA Environmental sample data were compared by calculating the Relative Percent Difference (RPD) between reported positive results (not attributed to blank contamination) for target compounds detected in the same sample evaluated by both laboratories. No positive results were reported for samples JF-TW05, ETH-TW03, and CP-TW01 in either the Nytest or RECRA analyses. Benzene and toluene were detected in the groundwater sample CP-TW05 at low

concentrations by both laboratories, yielding RPDs of 29 percent and 40 percent, respectively. The Nytest analysis of sample ETH-TW01 produced positive results for xylene (total) and 2-hexanone. RECRA Environmental only detected xylene (total). The RPD for this compound was 25 percent. These RPDs between the laboratories are expected to be reasonable.

2.0 COAL PILE STORAGE AREA (SITE 8)

2.1 SITE DESCRIPTION/ENVIRONMENTAL SETTING

The Coal Pile Storage Area is situated behind the Steam Plant in the south central portion of the NWIRP Calverton (Figure 1-2). Historically, the coal was used to fuel the boilers. Some of the coal from this area was used for road base material throughout the facility. There are reports that solvents were placed on the coal pile, so that when the coal was burned, the solvents would be destroyed.

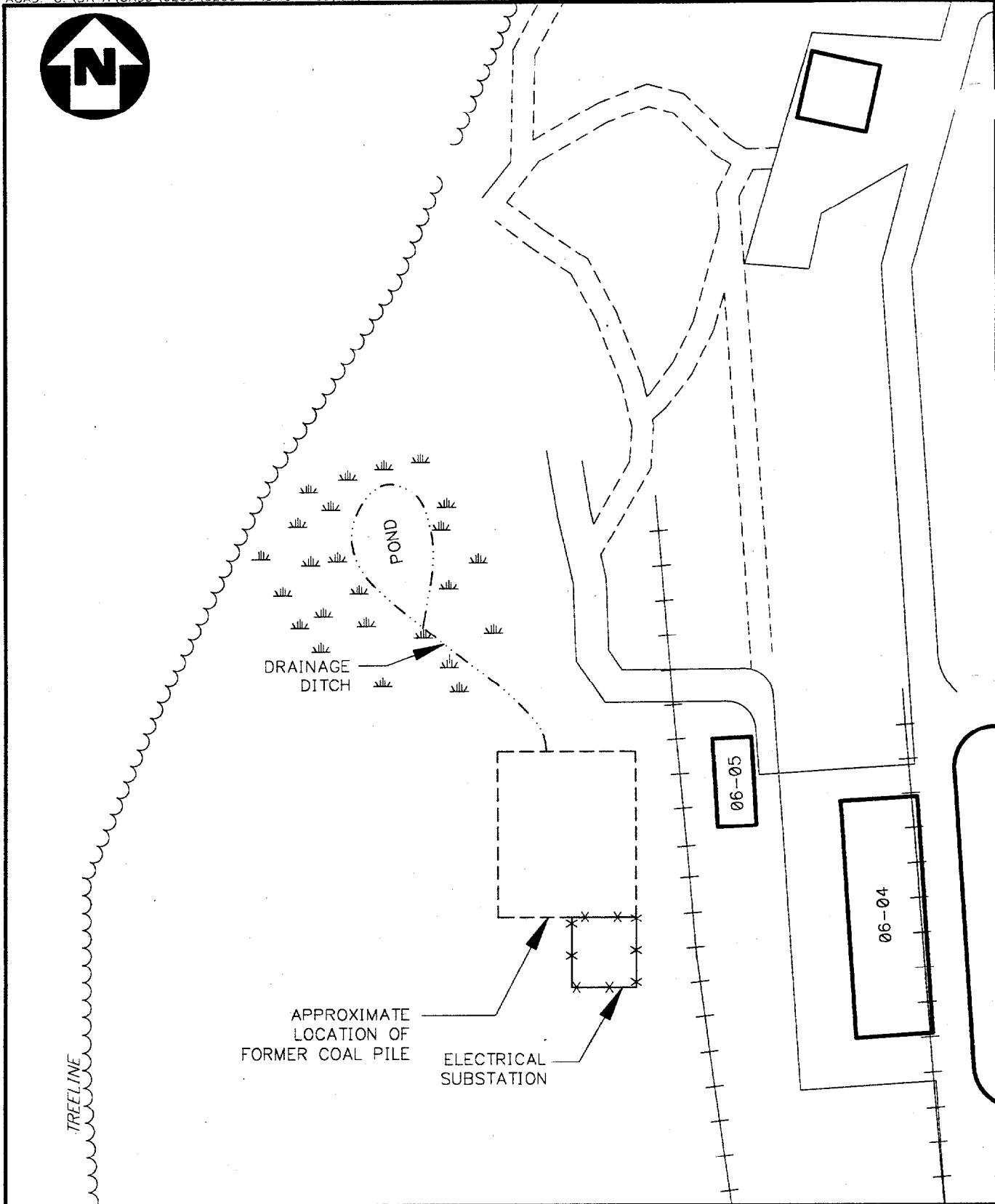
The site is generally flat with a shallow slope toward a swamp located immediately north of the coal pile, (Figure 2-1). Surface runoff, which forms during rain events, typically flows toward this swamp. The swamp is classified as a wetland under the Natural Resources Management Plan for the facility, (NRMP, 1989). In addition to runoff, the swamp periodically receives excess production well water (through a pressure relief valve).

To the south of the coal pile is a drainage ditch which receives boiler blowdown. This ditch drains toward the south. To the east of the coal pile is a grassy field and to the west is the steam plant. There are three production wells located approximately 500 feet to 1,500 feet to the north east. The wells are used as a potable and industrial water source. The production wells extract groundwater from a depth of about 145 feet below ground surface.

Production Wells PW2 and PW3 have exhibited evidence of solvent contamination. The most significant contaminants detected were Freon 113 and 1,1,1-trichloroethane at maximum concentrations of 14 ug/l and 5 ug/l, respectively. Activated carbon is currently used to treat water prior to use.

2.2 SAMPLING OBJECTIVES

The overall objective of the coal pile investigation during the initial RFA - Sampling Visit was to investigate the presence of chlorinated solvents detected in the adjacent production wells, as well as reports of solvents being placed on the coal pile. The initial RFA investigation focused on potential contaminants which may have been placed on the coal pile and migration pathways those contaminants may have followed.



APPROXIMATE SCALE 1" = 200'

SITE MAP
SITE 8 - COAL PILE STORAGE AREA
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

FIGURE 2-

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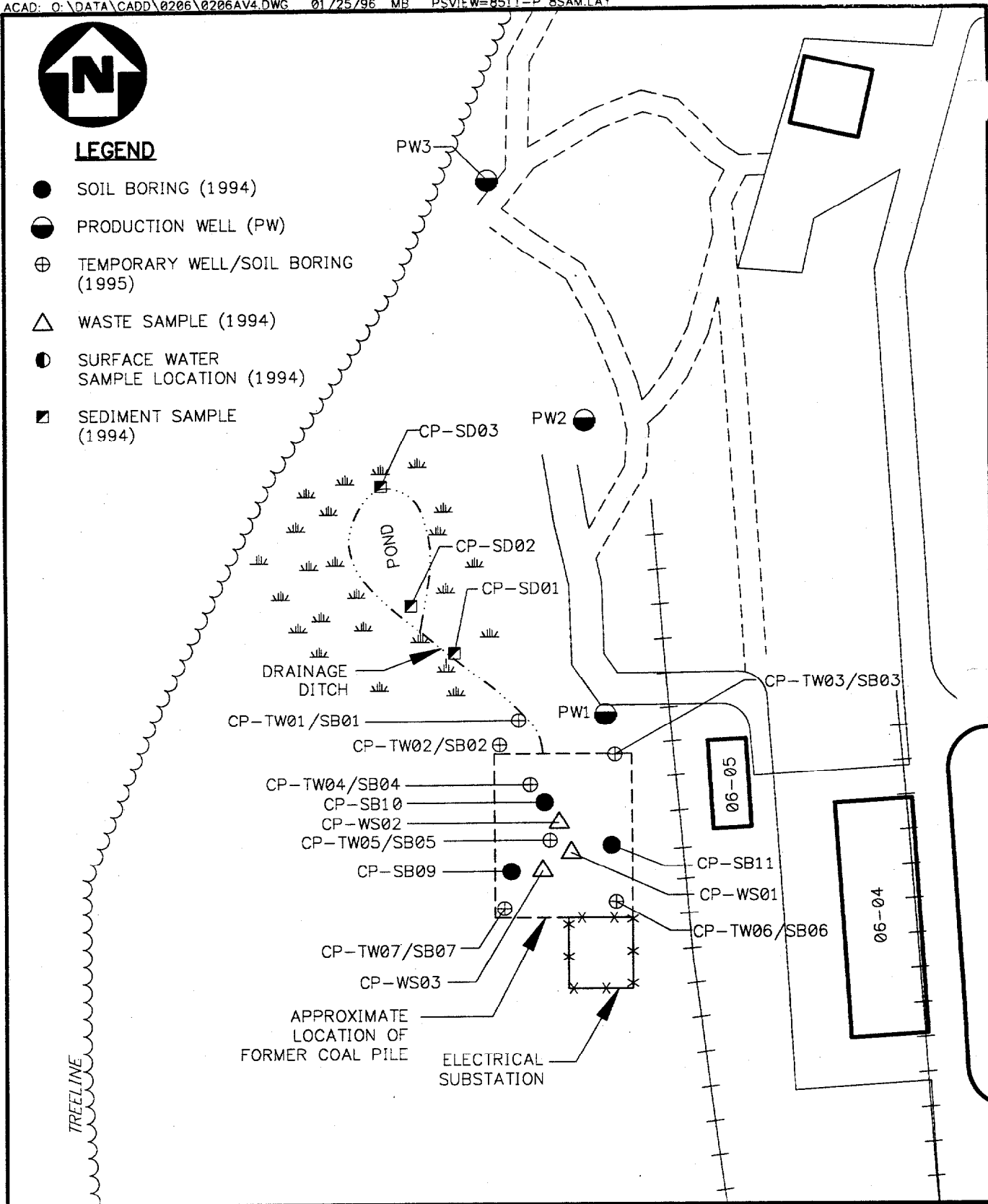
Based on the findings during the initial RFA - Sampling Visit, evidence of petroleum-based contaminants were suspected to be in the soils and potentially in the groundwater beneath the coal pile. However, due to the fact that no groundwater samples were taken at this site during the first RFA and because soils were not tested for TPH, the Technical Review Committee (TRC) recommended that VOC testing of the groundwater also be included to confirm the conclusions of the first phase RFA Report. The objectives of the RFA Addendum - Sampling Visit were to determine the presence or absence of petroleum-based contaminants in subsurface soils and groundwater, and if present, the approximate vertical and horizontal extent of contamination. A second objective was to determine if a free-product layer existed.

2.3 SAMPLING ACTIVITIES

Field activities performed at the Coal Pile Storage Area during the RFA - Sampling Visit Addendum included subsurface soil and groundwater sampling. Seven soil borings were installed and seven subsurface soil samples were collected from the soil/groundwater interface for chemical analysis. Also, seven groundwater samples were collected from temporary monitoring wells installed in each soil boring. All sampling, sample handling, and decontamination activities were performed in accordance with the initial RFA - Sampling Visit Work Plan (HNUS 1993a) and RFI Work Plan (HNUS 1993b). Boring logs, sample log sheets and Chain-of-Custody records are provided in Appendices A, B, and C, respectively. Laboratory analytical data is provided in Appendix E.

2.3.1 Soil Boring Installation and Subsurface Soil Sampling

Seven soil borings (CP-SB01 to CP-SB07) were installed at Site 8-Coal Pile Storage Area, and seven subsurface soil samples were collected for chemical analysis. Soil borings locations are shown on Figure 2-2. The soil borings were advanced using hollow stem auger drilling techniques. Two split-spoon samples were collected from each boring at the approximate soil/groundwater interface. Each sample was inspected for evidence of contamination (staining, sheen, or odor). The headspace of each sample was field screened with an FID organic vapor analyzer. FID readings were noted in the sample collected from CP-SB01-0406 (8 ppm). No other FID readings were noted above background in samples collected from the Coal Pile Area. Sample lithology, recovery length, color, and headspace readings were recorded on boring logs. Each soil boring was backfilled with drill cuttings after obtaining a groundwater sample from a temporary monitoring well installed in each boring.



APPROXIMATE SCALE 1" = 200'

SAMPLING LOCATIONS
1994 AND 1995 SAMPLE EVENTS
SITE 8 - COAL PILE STORAGE AREA
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

FIGURE 2-

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One subsurface soil sample from each boring collected immediately above the soil/groundwater interface was selected for chemical analysis with a preference for stained soils and/or elevated flame ionization detector (FID) readings, if observed. Subsurface soil samples were sent to RECRA Environmental, Inc. of Amherst, New York, and analyzed for diesel and gasoline range petroleum hydrocarbons.

2.3.2 Temporary Monitoring Well Installation and Groundwater Sampling

Each of the seven soil borings (CP-SB01 to CP-SB07) were converted to temporary monitoring wells (CP-TW01 to CP-TW07) at Site 8-Coal Pile Storage Area. The temporary monitoring wells were installed through the drilling augers after they had been advanced to approximately three feet below the water table in each soil boring. The temporary wells were constructed of 2-inch diameter PVC well casing and screen. The well screen was 10 feet long with .020-inch slots. The drilling augers were withdrawn approximately 1 to 5 feet above the bottom of the well screen, and the natural formation was allowed to backfill the annulus around the well screen. Three well casing volumes of groundwater were purged from each well prior to sampling. The groundwater samples were sent to Nytest Environmental, Inc. of Port Washington, New York, and analyzed for Target Compound List (TCL) volatiles plus Freon 113. Two of the seven samples were also sent to RECRA Environmental Inc., for confirmatory testing.

2.4 RESULTS OF ADDITIONAL SAMPLING VISIT

The following sections describe the results of the additional sampling activities at Site 8-Coal Storage Pile.

2.4.1 Geology

Evaluation of subsurface soil data from the three soil borings (CP-SB09, CP-SB10, and CP-SB11) installed during the initial RFA - Sampling Visit and the seven soil borings (CP-SB01 to CP-SB07) installed during the RFA - Sampling Visit Addendum indicate the site is covered by varying amounts of coal fragments and dust. Around the perimeter of the area, the coal layer is 2 to 4 inches thick and increases to approximately 2 feet at the center of the area. Fine to medium sand with trace amounts of silt underlie the coal to 13 feet, the total depth drilled at the site. Sand grain size increases with depth. Trace amounts of fine gravel are encountered at depths of 2 to 12 feet below ground surface.

2.4.2 Hydrogeology

During the initial RFA - Sampling Visit in April 1994, groundwater was encountered at a depth of approximately 5 feet below ground surface in soil boring CP-SB10 in the northern area of the site and at a

depth of approximately 8 feet below ground surface in soil borings CP-SB09 and CP-SB11 near the center of the site. During the fieldwork for the RFA - Sampling Visit Addendum in November 1995, the groundwater depths ranged from approximately 7.5 feet at CP-SB01 in the north area of the site to approximately 10 feet at CP-SB06 in the southeast. The groundwater depth was approximately 11 feet at CP-SB03; however, this well is located close to the production well PW-1 and the water level may have been influenced by it's operation. The groundwater flow direction is to the southeast, based on the RFI report (HNUS 1995b), however, the current and historic operations of the production wells may have affected the groundwater flow direction.

2.4.3 Analytical Results

Samples collected for chemical analyses during the RFA Addendum sampling included 7 subsurface soil samples at the soil/groundwater interface and 7 groundwater samples. Soil samples were analyzed for gasoline range and diesel range Total Petroleum Hydrocarbons (TPH) and groundwater samples were analyzed for TCL volatiles and Freon 113. The groundwater samples were analyzed by a local laboratory (Nytest) for quick turnaround. Two of the 7 samples were also sent to a fixed base laboratory (RECRA) for confirmation analyses. All soil samples were sent to RECRA for testing. The results of the sampling are presented in Table 2-1 and on Figure 2-3.

Results of the soil sampling showed positive detections of TPH in 4 of the 7 samples collected during the RFA Addendum sampling. The sample collected from CP-SB05-0810 contained the highest concentration of TPH (6.8 mg/kg). All remaining detections were reported below the laboratory detection limit. The location of this boring is in the vicinity of the center of the former coal pile.

Groundwater samples were collected from each of the 7 temporary wells installed during the RFA Addendum sampling. Benzene was detected at concentrations (1 ug/l to 4 ug/l), which slightly exceeds the New York State (NYS) groundwater action level of 0.7 ug/l in the samples collected from CP-TW04, CP-TW05, and CP-TW07. Toluene was detected in 3 samples at concentrations of 1 ug/l to 2 ug/l. However the reported concentrations did not exceed NYS groundwater action level (5 ug/l). Acetone and 1,2-dichloroethane were detected in all of the samples at concentrations ranging from 6 ug/l to 25 ug/l, however, these compounds were also detected in field blanks collected at the facility. As a result, it is believed that these chemicals are not actually present in the site groundwater but are the result of laboratory contamination

TABLE 2-1

**ANALYTICAL RESULTS - 1995 SAMPLE EVENT
SITE 8 - COAL PILE STORAGE
NWIRP CALVERTON, NEW YORK**

Groundwater (ug/l)

Compound	MDL RECRA/ NYTEST	Action Level ¹	CP-TW01		CP-TW02	CP-TW03	CP-TW04	CP-TW05		CP-TW06	CP-TW07
			RECRA	NYTEST	NYTEST	NYTEST	NYTEST	RECRA	NYTEST	NYTEST	NYTEST
Methylene chloride	1.4/2.0	5		5 B	4 B	5 B	4 B		3 B	5 B	6 B
Acetone	2.4/5.0	5		20 B	21 B	15 B	21 B		25 B	17 B	13 B
1,2-Dichloroethane	1.2/1.0	5		8 B	9 B	6 B	10 B		8 B	12 B	12 B
2-Butanone	2.6/1.4	5					2 B				
Benzene	1.2/1.0	0.7					1 J	4 J	3 J		1 J
Toluene	0.8/1.3	5					1 J	3 J	2 J		1 J

2-7

Soils (mg/kg)

Compound	Detection Limit	Action Level ²	CP-SB01- 0406		CP-SB02- 0608	CP-SB03- 1012	CP-SB04- 6585	CP-SB05- 0810		CP-SB06- 1012	CP-SB07- 0810
TPH - Gasoline Range	2.0	10						1.3			
TPH - Diesel Range	2.0	10	1.8		2.0			6.8			1.6

MDL - Method Detection Limit

Blank - Indicates that the chemical was not detected.

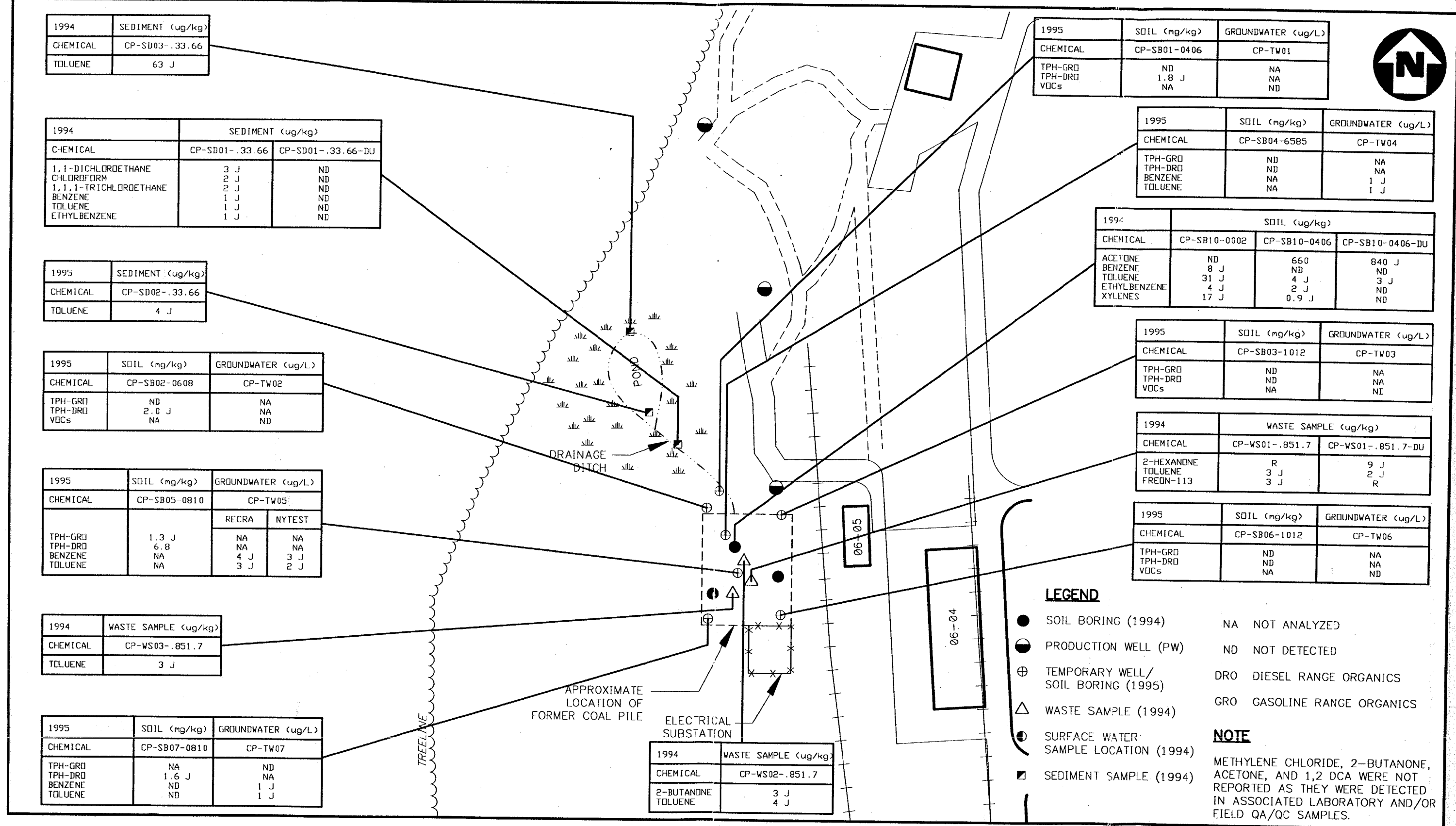
B - Indicates that compound was also detected in field or lab QA/QC blank sample. Therefore, chemicals with their results qualified by a "B" are not likely to be present in the sample.

J - For benzene and toluene, the "J" indicates the compound was detected, however the reported result is below the Contract Required Quantitation Limit (CRQL), which is 10 ug/l for both of these compounds.

1. - NYS Public Water Supplies, 10 NYCRR Part 5.

2. - Action level for TPH is based on New York State Technology and Remediation Series, Petroleum-Contaminated Soil Guidance (STARS Memo #1).

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POSITIVELY DETECTED ANALYTICAL RESULTS - 1994 AND 1995 SAMPLE EVENTS
 SITE 8 - COAL PILE STORAGE AREA
 RFA ADDENDUM
 NWIRP, CALVERTON, NEW YORK

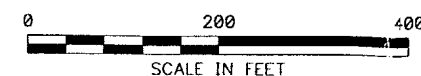


FIGURE 2-3

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An evaluation of the initial RFA sampling results (1994) and the RFA Addendum sampling (1995) shows that a minor source of contamination remains centered in the Coal Pile (CP-TW04, CP-TW05, and CP-TW07). Chemicals detected in site soils in the 1994 RFA study included benzene (8J ug/kg), toluene (31J ug/kg), ethylbenzene (4J ug/kg), and xylenes (17J ug/kg). Chemicals detected in site sediments in this study included 1,1-dichloroethane (3J ug/kg), chloroform (2J ug/kg), 1,1,1-trichloroethane (2J ug/kg), benzene (1J ug/kg), toluene (1J ug/kg), and ethylbenzene (1J ug/kg). Potential downgradient wells CP-TW01, CP-TW02, CP-TW03, and CP-TW06 did not have detectable levels of contamination.

2.5 FATE AND TRANSPORT

Soils from the site were tested for total petroleum hydrocarbons as an inclusive indicator of fuel contamination. Fuels that may be found at the site include jet fuel, diesel, and to a limited extent gasoline. These fuels have a low solubility in water and will float on the surface of groundwater. In bulk, the fuels will form a floating free-product layer that does not move quickly through soils and will eventually biodegrade. These fuels consist of a variety of individual organic compounds, with varying properties.

Volatile organic compounds found in fuels, such as toluene and benzene, are more water soluble than the bulk fuel, and will leach from the fuels to water. Once in the water, they will migrate with precipitation infiltration and groundwater. These compounds will biodegrade naturally in soils and groundwater. Also, the compounds will evaporate into the air, where they will undergo photochemical degradation.

Semi-volatile organics components of fuels are generally less water soluble than volatile organic compounds and do not migrate through the environment as fast. Even though they also biodegrade naturally overtime, they do not degrade as fast as many of the volatile organics compounds.

2.6 CONCLUSIONS AND RECOMMENDATIONS

1. Trace levels of petroleum-based chemicals were found in the soils, sediment, and groundwater at this site. The only chemical found at a concentration above Federal or State action levels was benzene in groundwater at a maximum concentration of 4 ug/l. For comparison, the state action level for benzene in drinking water is 0.7 ug/l and the Federal action level is 5 ug/l.
2. Based on the finding of only minimal quantities of petroleum-based organic compounds, and the consideration that these compounds will naturally biodegrade, no additional investigations or remedial actions are recommended for this site under the IR Program.

3. Due to the impending transfer of the Calverton property, the chemicals found at this site and their concentrations will be identified on the appropriate transfer documents.

3.0 ELECTRONIC COUNTER MEASURES (ECM) AREA (SITE 9)

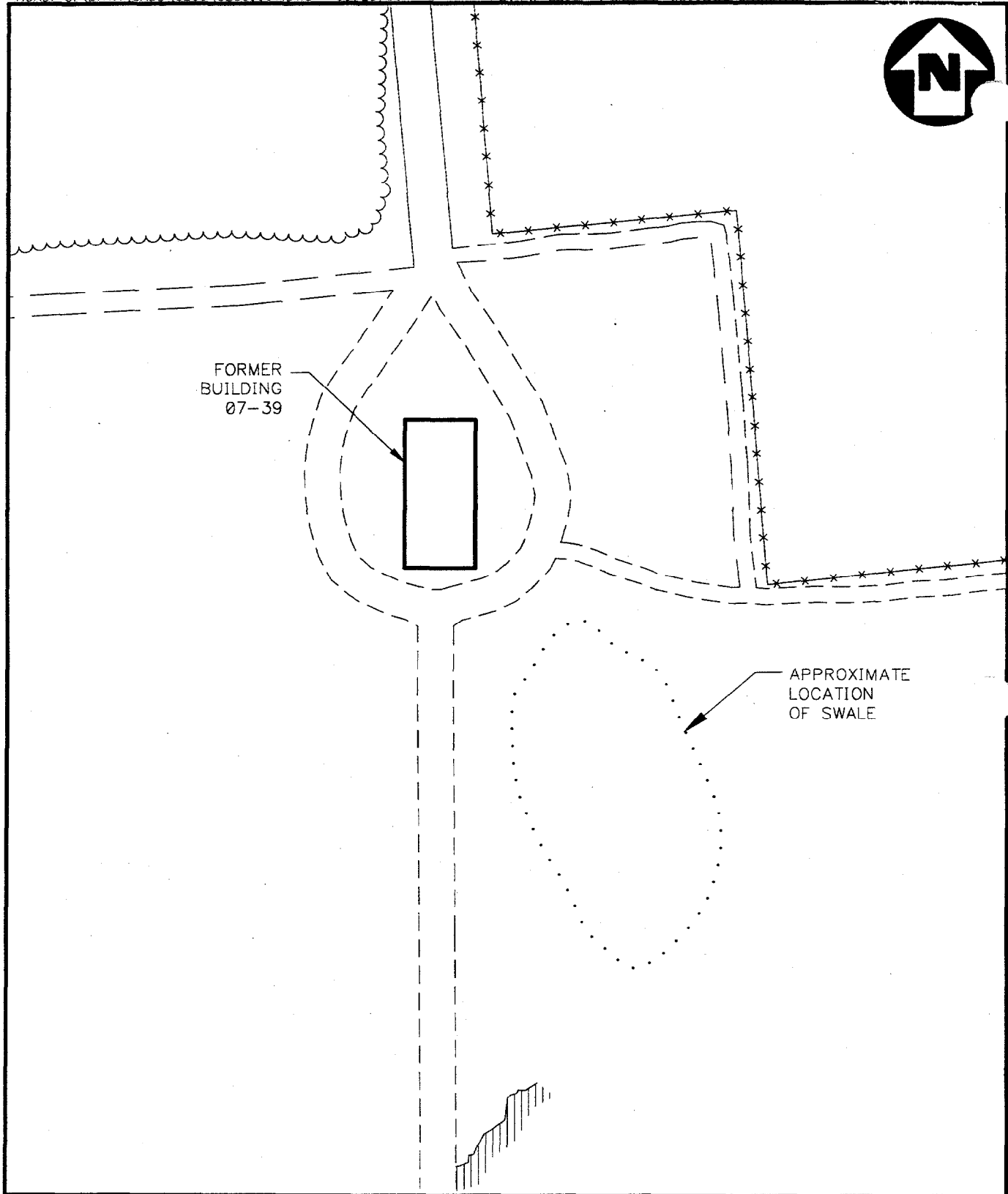
3.1 SITE DESCRIPTION/ENVIRONMENTAL SETTING

The Electronic Counter Measure (ECM) Area is located in the northeast corner of the NWIRP Calverton, (Figure 1-2). This area was constructed in the early 1970's and was recently used for testing and evaluating various electronic counter measure equipment. No manufacturing occurred at this site. However, 1,1,1-trichloroethane (TCA) was used as a cleaning agent at this site. It had been reported that approximately 10 gallons per year of TCA were used in the cleaning of miscellaneous parts.

General site features include an old disposal area located approximately 600 feet to the south and two depressions located within a swale located to the southeast (Figure 3-1). It is likely that these depressions used to consist of a natural drainage swale leading to the south. Construction debris and miscellaneous equipment are visible in and around the disposal area and throughout the southeast depression. The former ECM Building (Building 07-39) has been demolished since the initial RFA sampling occurred.

Located to the east of the ECM Area is the property fence line. Beyond the fence line is a sod farm. A portion of the sod farm (nearest the ECM Area) was selected as an experimental program for growing sod using municipal solid waste compost to amend the natural soils and provide nutrients. As part of the experimental program, a series of monitoring wells (MW-1 to MW-7) were installed and are being monitored by the Suffolk County Department of Health. TCA at a concentration of 190 ug/l was detected in the well furthest from the ECM Area (MW-7). Monitoring wells closer to the site exhibited lower concentrations of chemicals. Also noted during site visits conducted in 1993 and 1994 was the presence of several drums located just northeast of the ECM Area, on the sod farm, and near the fence.

In addition to the ECM area potentially being the source of the offsite contamination, coal from the coal pile storage area (Site 8) was used as a road base material along the perimeter of the site. The location of the coal is directly between the ECM area and the offsite monitoring wells.



SITE MAP
SITE 9 - ECM AREA
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

FIGURE 3

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3.2 SAMPLING OBJECTIVES

The initial RFA - Sampling Visit at the ECM Area was conducted at the request of the Suffolk County Department of Health. According to the Health Department, TCA was detected in samples collected from offsite county wells. Groundwater flow patterns estimated by the County indicated that the ECM Area could be a potential source of the contamination.

Testing conducted during the initial RFA - Sampling Visit did not find TCA in any of the soil samples collected onsite, however it was detected in groundwater samples collected from the County wells located just offsite to the northeast. Based on these results, temporary monitoring well installation and sampling were proposed as part of the RFA Addendum to more accurately assess the groundwater quality between the former ECM Building and the County wells. If groundwater contamination was found, a second objective was to determine if there was still an active source contributing to this contamination.

3.3 SAMPLING ACTIVITIES

Field activities performed at Site 9-ECM Area during the RFA - Sampling Visit Addendum included the drilling, installation, and sampling of six temporary monitoring wells. In addition, two new permanent monitoring wells were drilled, installed, and sampled along with two existing monitoring wells. All sampling, sample handling, and decontamination activities were performed in accordance with the RFI Work Plan (HNUS 1993b). Boring logs, sample log sheets, Chain-of-Custody records, and monitoring well construction sheets are provided in Appendices A, B, C, and D, respectively. Laboratory analytical data is provided in Appendix E.

3.3.1 Temporary Monitoring Well Installation and Groundwater Sampling

Six groundwater samples were collected from six temporary monitoring wells (ECM-TW01 to ECM-TW06) installed at Site 9. Temporary monitoring well locations are shown in Figure 3-2. The borings were advanced using hollow stem augering techniques. Drill cutting lithology, color, and FID organic vapor analyzer readings were recorded on boring logs. No FID readings were noted in any of the samples obtained. The temporary monitoring wells were installed through the drilling augers after they had been advanced to approximately three feet below the water table in each soil boring. The temporary wells were constructed of 2-inch diameter PVC well casing and screen. The well screen was 10 feet long with .020-inch slots. The drilling augers were withdrawn approximately 1 to 5 feet above the bottom of the well screen, and the natural formation was allowed to backfill the annulus around the well screen. Three well casing volumes of groundwater were purged from each well prior to sampling. The groundwater samples

were sent to Nytest Environmental, Inc. of Port Washington, New York, and analyzed for Target Compound List (TCL) volatiles plus Freon 113. The well borings were backfilled with the drill cuttings after groundwater samples had been collected.

3.3.2 Permanent Monitoring Well Installation and Groundwater Sampling

Two permanent monitoring wells (ECM-MW01 and ECM-MW02) were installed at Site 9. Permanent monitoring well locations are shown on Figure 3-2. The well borings were advanced with 10-inch outside diameter hollow stem augers. Four-inch diameter, Schedule 40 PVC well casing and screen were installed through the augers after they had been advanced to the desired depth. The well screen was 10 feet long with .020-inch slots. The top of the well screen was placed approximately 1 to 3 above the water table. The annulus around the well screen was backfilled with clean, Morie #2 silica sand to approximately 2 foot above the well screen. A 2 to 3 foot bentonite seal was placed on top of the sand filter pack. Cement grout was backfilled from the top of the seal to approximately 3 feet below ground surface. A locking steel casing was cemented in place around the well casing at the surface. Monitoring well construction sheets are provided in Appendix D. The drill cuttings were spread out around the wells.

The monitoring wells were developed a minimum 24 hours after installation with an air lift pump until the purged water cleared to a turbidity of less than 50 NTU and pH, specific conductivity, temperature, salinity, and dissolved oxygen parameters stabilized. All development water was containerized.

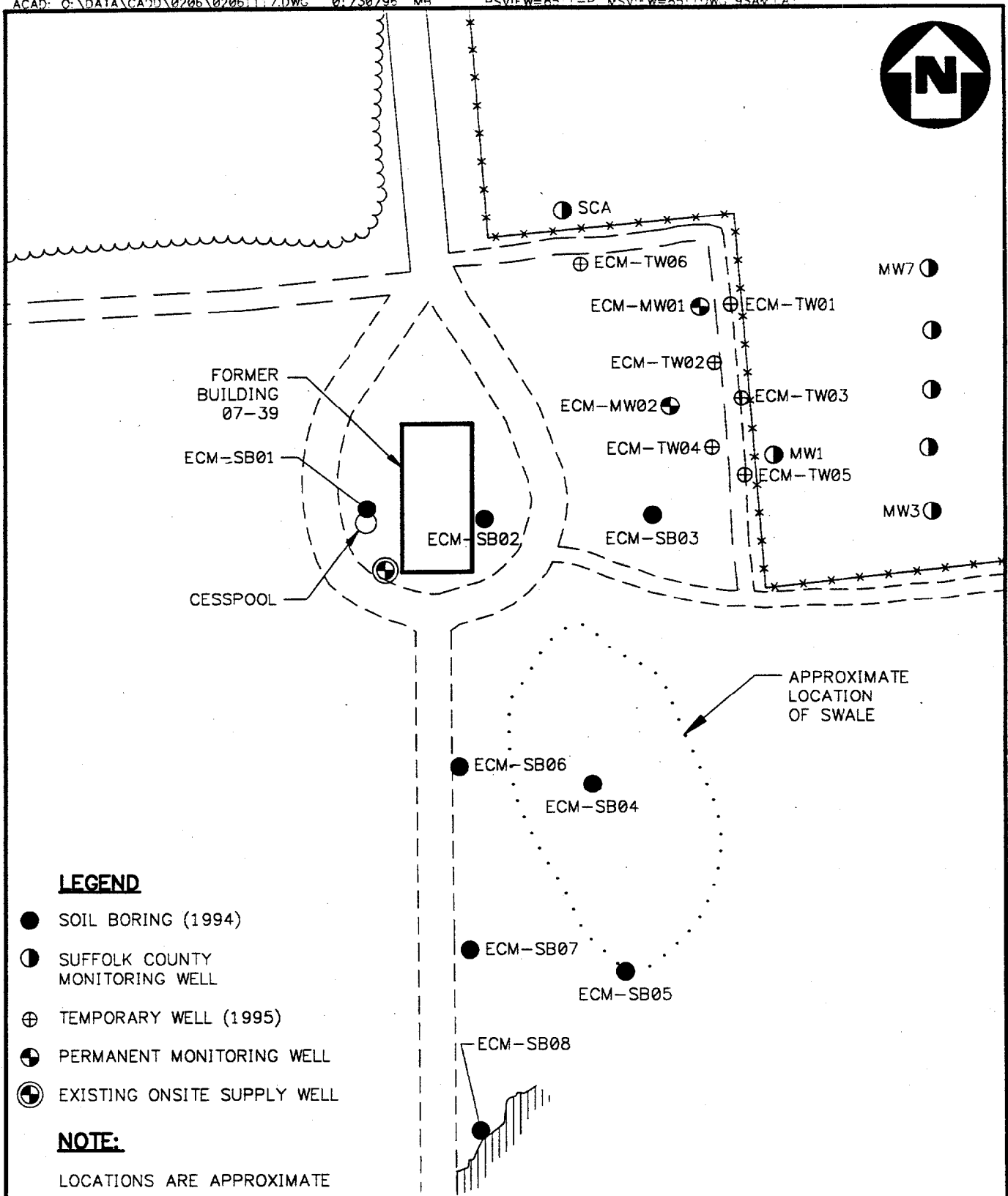
Groundwater samples were collected from two newly installed permanent monitoring wells (ECM-MW01 and ECM-MW02), and two Suffolk County Health Department monitoring wells (SCA and MW1). Three well casing volumes of groundwater were purged from each well prior to sampling. pH, specific conductivity, temperature, salinity, turbidity, and dissolved oxygen parameters were measured after each purged well volume (see Appendix B). The groundwater samples were sent to RECRA and analyzed for Target Compound List (TCL) volatiles plus Freon 113.

3.4 RESULTS OF ADDITIONAL SAMPLING VISIT

The following sections describe the results of the additional sampling activities at the ECM Area.

3.4.1 Geology

Based on data from the eight soil borings installed during the initial RFA - Sampling Visit (ECM-SB01 to ECM-SB08) and the six soil borings and two permanent monitoring wells installed during the RFA -



APPROXIMATE SCALE 1" = 200'
SAMPLING LOCATIONS
1994 AND 1995 SAMPLING EVENTS
SITE 9 - ECM AREA
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

FIGURE 3-2

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Sampling Visit Addendum (ECM-TW01 to ECM-TW06 and ECM-MW01 to ECM-TW02, respectively), Site 9 is underlain by fine to medium sand with trace amounts of fine gravel and very trace amounts of silt and clay to 45 feet, the total depth drilled at the site.

3.4.2 Hydrogeology

During the initial RFA - Sampling Visit in April 1994, groundwater was encountered at Site 9 at approximately 29 to 35 feet below ground surface across the site. During the fieldwork for the RFA - Sampling Visit Addendum in November 1995, the groundwater depth ranged from approximately 33 to 41.5 feet. The groundwater flow direction is to the northeast based on the RFI report (HNUS 1995b).

3.4.3 Analytical Results

Samples collected for chemical analyses during the RFA Addendum sampling included 10 groundwater samples obtained from six temporary monitoring wells, two existing Suffolk County monitoring wells, and two newly installed monitoring wells. Groundwater samples obtained from the temporary wells were sent to Nytest for quick turnaround and analyzed for TCL volatiles and Freon 113. Groundwater samples collected from the remaining four wells were sent to RECRA and analyzed for TCL volatiles and Freon 113. Sample results are presented in Table 3-1 and on Figure 3-3.

The most pervasive compound detected at Site 9 was 1,1,1-trichloroethane. TCA was detected in all of the temporary monitoring wells except ECM-TW06. TCA was also detected in the two newly installed monitoring wells (ECM-GW01 and ECM-GW02). Concentrations ranged from 2 ug/l (ECM-TW05) to 35 ug/l (ECM-TW01). The New York State action level for TCA in drinking water is 5 ug/l. Groundwater samples collected from the six temporary monitoring wells showed positive detections of methylene chloride, acetone and/or 1,2-dichloroethane at concentrations ranging from 5 ug/l to 26 ug/l. However these compounds were also detected in field blanks collected at the facility. As a result, it is believed that these chemicals are not actually present in the site groundwater, but are the result of laboratory contamination.

No positive detections of TCA or other VOCs were noted in either of the samples collected from the offsite wells (SCA and MW1).

TABLE 3-1

**ANALYTICAL RESULTS - 1995 SAMPLE EVENT
SITE 9- ELECTRONIC COUNTER MEASURES (ECM) AREA
NWIRP CALVERTON, NEW YORK**

Groundwater (ug/l)

Compound	MDL	Action Level ¹	ECM-TW01	ECM-TW02	ECM-TW03	ECM-TW04	ECM-TW05
			NYTEST	NYTEST	NYTEST	NYTEST	NYTEST
Chloromethane	2.7	5			1J		
Methylene chloride	2.0	5	6 B	5 B	5 B	5 B	5 B
Acetone	5.0	5		26 B	23 B	18 B	17 B
1,2-Dichloroethane	1.0	5		15 B	13 B	9 B	6 B
1,1,1-Trichloroethane	1.1	5	35	19	14	7	2 J

Compound	MDL RECRA/ NYTEST	Action Level ¹	ECM-TW06	ECM-GW01	ECM-GW02	SCA	MW-1
			NYTEST	RECRA	RECRA	RECRA	RECRA
Methylene chloride	1.4/2.0	5	8 B				
Acetone	2.4/5.0	5	7 B				
1,2-Dichloroethane	1.2/1.0	5					
1,1,1-Trichloroethane	0.6/1.1	5		18	25		

MDL - Method Detection Limit

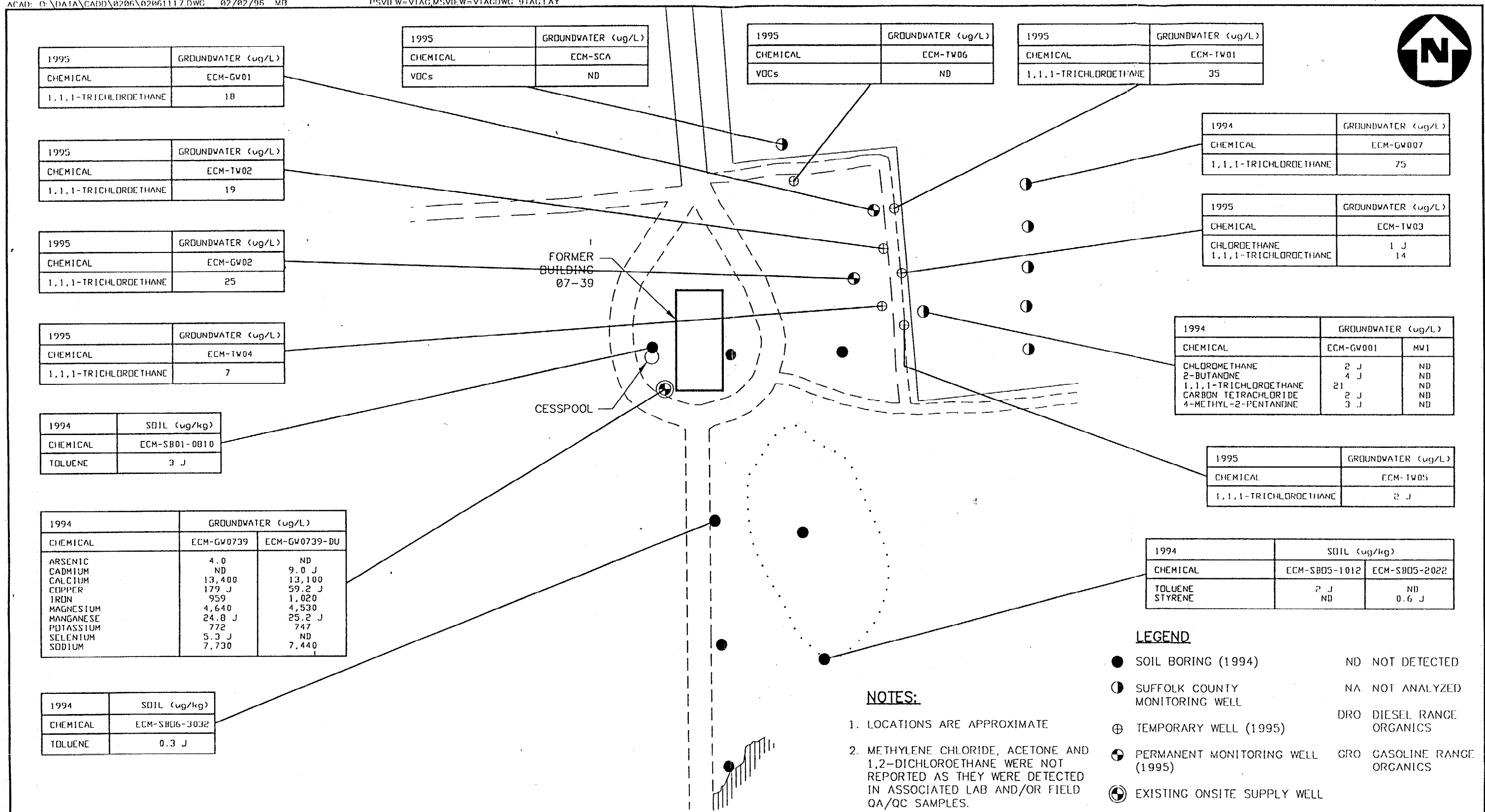
Blank - Indicates that the chemical was not detected.

B - Indicates that compound was also detected in field or lab QA/QC blank sample. Therefore, chemicals with their results qualified by a "B" are not likely to be present in the sample.

J - For chloromethane and 1,1,1-trichloroethane, the "J" indicates the compound was detected, however the reported result is below the Contract Required Quantitation Limit (CRQL), which is 10 ug/l for both of these compounds.

1. - NYS Public Water Supplies, 10 NYCRR Part 5.

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POSITIVELY DETECTED ANALYTICAL RESULTS

SITE 9 - ECM AREA

RFA ADDENDUM

NWIRP, CALVERTON, NEW YORK

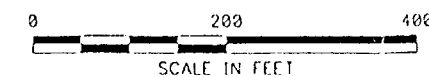


FIGURE 3-3

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3.5 FATE AND TRANSPORT

The only contaminant detected at the ECM Area was TCA. TCA is a volatile organic compound which readily evaporates into the atmosphere. Once in the atmosphere, it will be destroyed through natural photochemical degradation.

If TCA is discharged onto the ground surface in bulk, it will migrate downward directly to the groundwater or it will dissolve in precipitation infiltration and then migrate to the groundwater. In a pure form, TCA is denser than water and if it reaches the groundwater table, it will continue to migrate downward until either it all dissolves in the groundwater or it reaches a confining layer. Dissolved TCA will migrate with groundwater.

In soils and groundwater, natural biodegradation mechanisms will convert TCA to more mobile compounds consisting of dichloroethane and chloroethane. These compounds will migrate to the atmosphere by soil gas transport. However, both of the removal mechanisms are relatively slow and the volatile organic compounds will remain in, and migrate with, groundwater for extended periods of time.

3.6 CONCLUSIONS AND RECOMMENDATIONS

1. TCA was found in onsite groundwater at a maximum concentration of 35 ug/l. For comparison, the state and Federal action levels for TCA in drinking water are 5 ug/l and 200 ug/l, respectively.
2. Based on the use of TCA at the site, the findings of TCA in onsite and offsite groundwater, and reported direction of groundwater flow (to the northeast), the ECM Area operation was a likely source of the observed groundwater contamination. However, based on the concentration distribution with higher TCA concentrations being observed off site and hydraulically downgradient than on site, it is likely that the ECM Area is not a continuing source of groundwater contamination. This conclusion is further supported by the absence of TCA contamination in the soils near the suspected source of the TCA.
3. The nature and extent of offsite TCA contamination needs to be defined. This work will be performed in an upcoming RFI.

4.0 JET FUEL SYSTEMS LAB (SITE 10A)

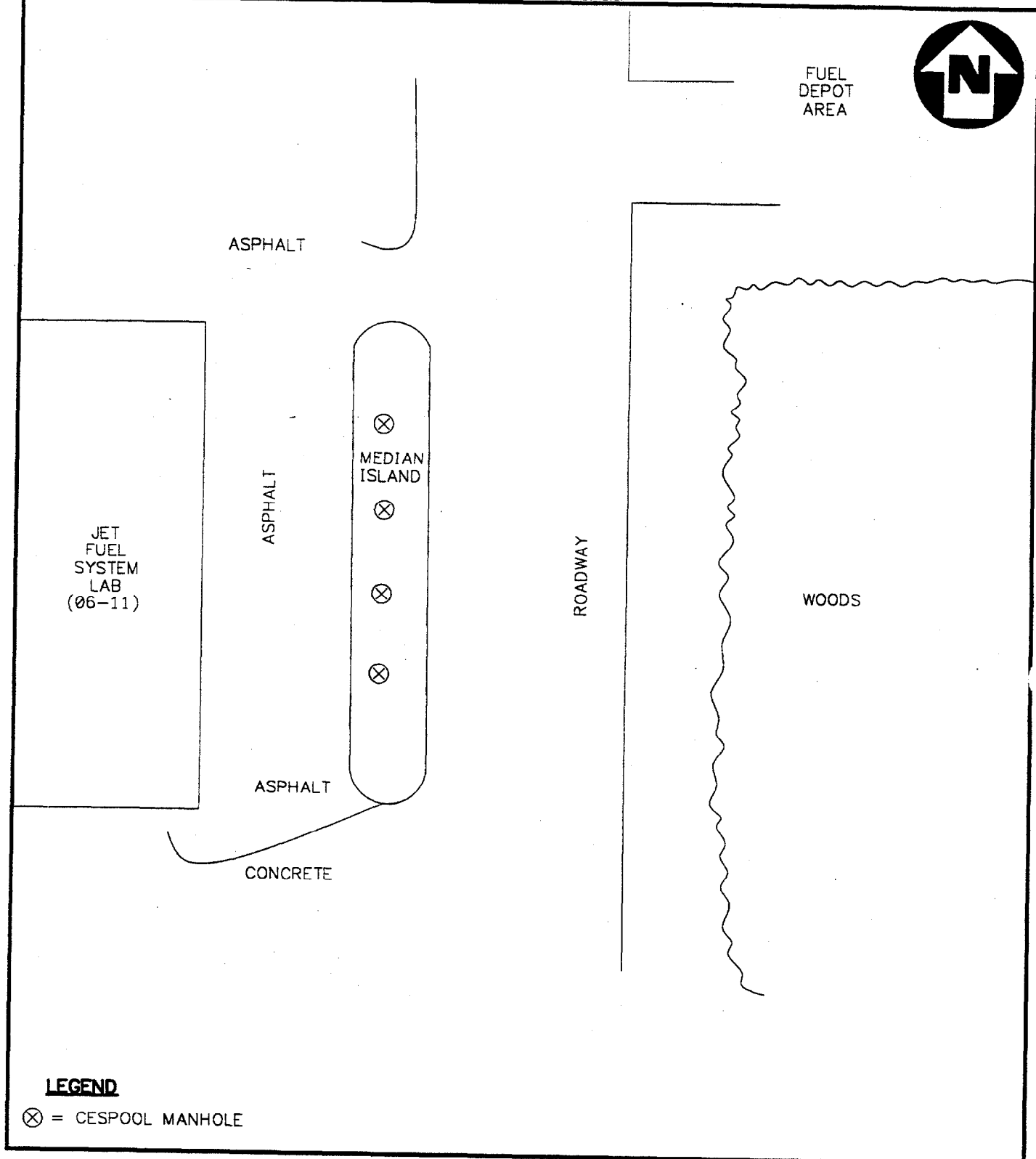
4.1 SITE DESCRIPTION/ENVIRONMENTAL SETTING

The Jet Fuel Systems Lab is situated east of the three production wells for the facility and across the street and just south of the Fuel Depot (Figure 1-2). The site was investigated during the initial RFA as part of a cesspool/leachfield investigation to determine the presence of potential industrial wastewater overflow releases into the cesspool/leachfields. The RFA - Sampling Visit Addendum was conducted because the initial investigation was not conclusive as to the presence or absence of contamination. The area of investigation centered around the location of four cesspools located in front of the jet fuel system lab (Figure 4-1). Also, groundwater from production wells located adjacent to the jet fuel systems laboratory contain concentrations of VOCs (including freon) at concentrations greater than drinking water standards. The RFA investigation did not find VOC contamination in the soils at this area. However the detection limits reported for VOCs were approximately 700 times higher than typical detection limits because of test interferences. Also, based on field observations and tentatively identified compounds (TICs) results, petroleum contamination may be present at the site. Grumman conducted floating free product recovery from the groundwater up to early 1996.

The Jet Fuel Systems Lab was used for the testing of fuels and fuel systems. Additional site features include an area behind the northwestern corner of the Jet Fuel System Lab, where several underground storage tanks were recently removed.

4.2 SAMPLING OBJECTIVES

The overall objective of the RFA Addendum sampling at the Jet Fuel Systems Lab was to determine if suspected petroleum related contaminants detected in soils near the cesspools during the initial RFA - Sampling Visit were present in soils and if VOC contamination was present in the groundwater. If contamination was present, a second objective was to determine an approximate aerial extent of the contamination.



APPROXIMATE SCALE 1" = 30'

SITE MAP
SITE 10A - JET FUEL SYSTEM LAB (06-11)
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

FIGURE 4-1

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4.3 SAMPLING ACTIVITIES

Field activities performed at Site 10A - Jet Fuel System Lab Area during the RFA - Sampling Visit Addendum included subsurface soil and groundwater sampling. Five soil borings were installed and five subsurface soil samples were collected for chemical analysis. Five groundwater samples were collected from temporary monitoring wells installed in each soil boring. All sampling, sample handling, and decontamination activities were performed in accordance with the initial RFA - Sampling Visit Work Plan (HNUS 1993a) and RFI Work Plan (HNUS 1993b). Boring logs, sample log sheets and Chain-of-Custody records are provided in Appendices A, B, and C, respectively. Laboratory analytical data is provided in Appendix E.

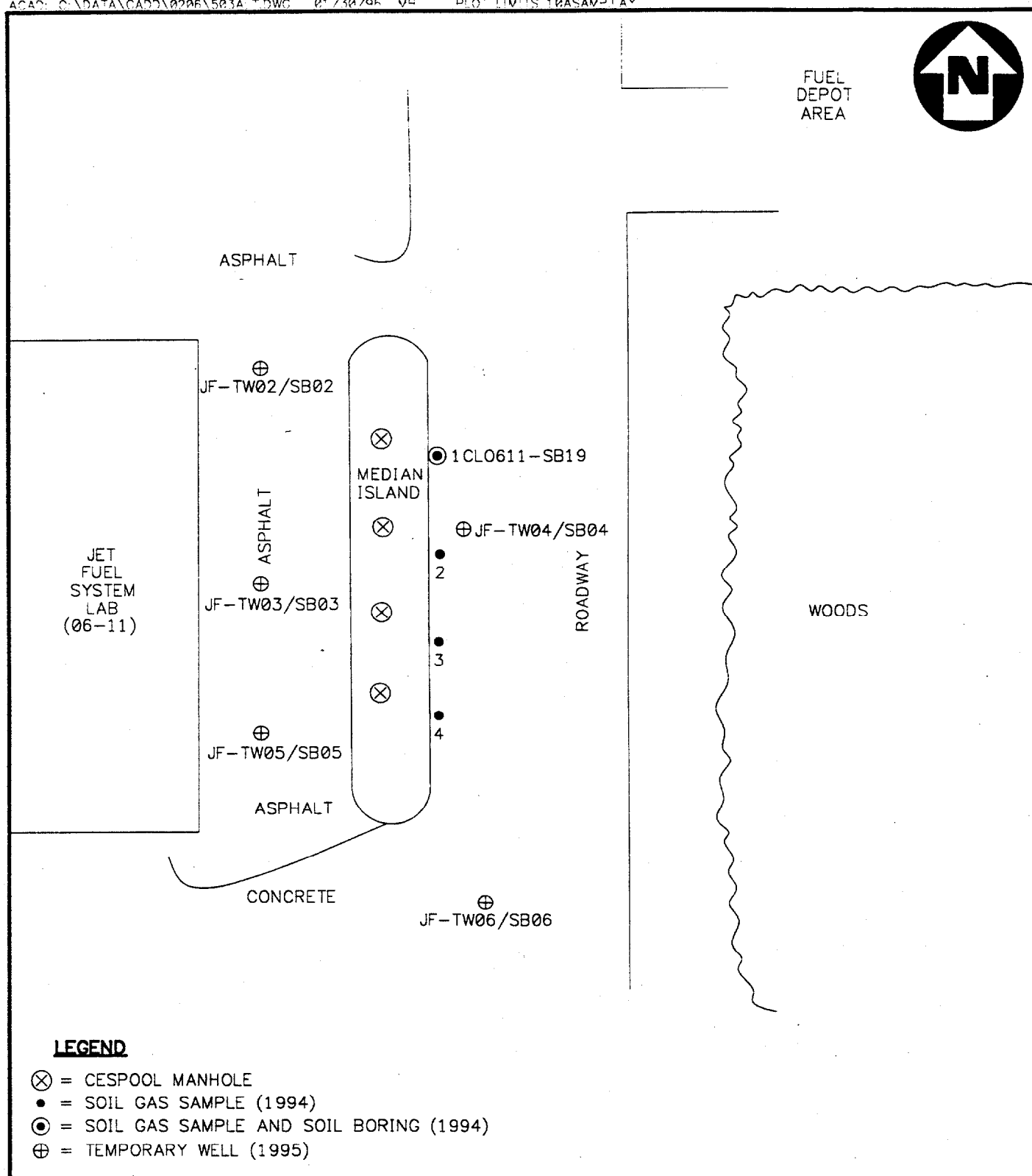
4.3.1 Soil Boring Installation and Subsurface Soil Sampling

Five soil borings (JF-SB02 to JF-SB06) were installed at the Site 10A-Jet Fuel System Lab Area, and five subsurface soil samples were collected for chemical analysis. Soil borings locations are shown in Figure 4-2. The soil borings were advanced using hollow stem augering techniques. Two split-spoon samples were collected from each boring, except for JF-TW05 and JF-TW06, at the soil/groundwater interface. Four split-spoon samples were collected at JF-TW05, and one split-spoon sample was collected at JF-TW06. Each sample was inspected for evidence of contamination (staining, sheen, or odor). The headspace of each sample was field screened with an FID organic vapor analyzer. No FID readings were noted in any of the samples obtained. Sample lithology, recovery length, color, and headspace readings were recorded on boring logs. The soil borings were backfilled with the drill cuttings after groundwater samples had been collected from each boring.

Five of the subsurface soil samples were sent to RECRA and analyzed for diesel and gasoline range petroleum hydrocarbons. One subsurface soil sample from each boring collected immediately above the soil/groundwater interface was selected for chemical analysis with a preference for stained soils and/or elevated FID readings, if observed.

4.3.2 Temporary Monitoring Well Installation and Groundwater Sampling

Each of the five soil borings (JF-SB02 to JF-SB06) were converted to temporary monitoring wells (JF-TW02 to JF-TW06). The temporary monitoring wells were installed through the drilling augers after they had been advanced to approximately 2 to 3 feet below the water table in each soil boring. The temporary wells were constructed of 2-inch diameter PVC well casing and screen. The well screen was 10 feet long with .020-inch slots. The drilling augers were withdrawn approximately 5 feet, and the



APPROXIMATE SCALE 1" = 30'

SAMPLING LOCATIONS

1994 AND 1995 SAMPLING EVENTS

SITE 10A - JET FUEL SYSTEM LAB (06-11)

RFA ADDENDUM

NWIRP, CALVERTON, NEW YORK

FIGURE 4-2

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natural formation was allowed to backfill the annulus around the well screen. Three well casing volumes of groundwater were purged from each well prior to sampling. The groundwater samples were sent to Nytest Environmental, Inc. and analyzed for Target Compound List (TCL) volatiles plus Freon 113.

4.4 RESULTS OF ADDITIONAL SAMPLING VISIT

The following sections describe the results of the additional sampling activities at the Jet Fuel Systems Lab.

4.4.1 Geology

A single soil boring was drilled during the initial RFA - Sampling Visit at the Jet Fuel System Lab Area to a depth of approximately 12 feet. Based on this data and soil boring data from the RFA - Sampling Visit Addendum, the site is underlain by fine sand with trace amounts of fine gravel and medium sand to 20 feet, the total depth drilled at the site.

4.4.2 Hydrogeology

During the fieldwork for the RFA - Sampling Visit Addendum in November 1995, the groundwater was encountered at approximately 17 to 18 feet below ground surface, except for JF-TW06. Groundwater was encountered at approximately 15 feet below ground surface at JF-TW06. The groundwater flow direction is to the southeast based on the RFI report (HNUS 1995b).

4.4.3 Analytical Results

Samples collected during the RFA Addendum sampling included 5 subsurface soil samples obtained at the soil/groundwater interface and 5 groundwater samples. Soil samples were analyzed for gasoline range and diesel range Total Petroleum Hydrocarbons (TPH) and groundwater samples were analyzed for TCL volatiles and Freon 113. The groundwater samples were analyzed by a local laboratory (Nytest) for quick turnaround. One of the groundwater samples (JF-TW05) was also sent to a fixed-base laboratory (RECRA) for confirmation analyses. All of the soil samples were sent to RECRA for testing. The results of the sampling are presented in Table 4-1 and on Figure 4-3.

TABLE 4-1

**ANALYTICAL RESULTS - 1995 SAMPLE EVENT
SITE 10A - JET FUEL SYSTEM LAB
NWIRP CALVERTON, NEW YORK**

Groundwater (ug/l)

Compound	MDL RECRA/ NYTEST	Action Level ¹	JF-TW02	JF-TW03	JF-TW04	JF-TW05		JF-TW06
			NYTEST	NYTEST	NYTEST	RECRA	NYTEST	NYTEST
Methylene chloride	1.4/2.0	5	4 B	3 B	4 B		4 B	5 B
Acetone	2.4/5.0	5	7 B	8 B	6 B			13 B
1,2-Dichloroethane	1.2/1.0	5						8 B

Soils (mg/kg)

Compound	Detection Limit	Action Level ²	JF-SB02- 1618	JF-SB03- 1618	JF-SB04- 1618	JF-SB05- 1618		JF-SB06- 1618
TPH - Gasoline Range	2.0	10						
TPH - Diesel Range	2.0	10			1.6			

MDL - Method Detection Limit

Blank - Indicates that the chemical was not detected.

B - Indicates that compound was also detected in field or lab QA/QC blank sample. Therefore, chemicals with their results qualified by a "B" are not likely to be present in the sample.

1. - NYS Public Water Supplies, 10 NYCRR Part 5.

2. - Action level for TPH is based on New York State Technology and Remediation Series, Petroleum-Contaminated Soil Guidance (STARS Memo #1).

FUEL
DEPOT
AREA

1995	SOIL (mg/kg)	GROUNDWATER (ug/L)
CHEMICAL	JF-SB02-1618	JF-TW02
TPH-DRO	ND	NA
TPH-GRO	ND	NA
VOCs	NA	ND

ASPHALT

1995	SOIL (mg/kg)	GROUNDWATER (ug/L)
CHEMICAL	JF-SB03-1618	JF-TW03
TPH-DRO	ND	NA
TPH-GRO	ND	NA
VOCs	NA	ND

ASPHALT

JET
FUEL
SYSTEM
LAB
(06-11)

1995	SOIL (mg/kg)	GROUNDWATER (ug/L)
CHEMICAL	JF-SB05-1618	JF-TW05
		RECRA NYTEST
TPH-DRO	ND	NA
TPH-GRO	ND	NA
VOCs	NA	ND

ASPHALT

CONCRETE

MEDIAN
ISLAND

ROADWAY

WOODS

1994	SOIL GAS (ug/L)	SOIL (ug/kg)
CHEMICAL	SG-JFSL-1	CL0611-SB19-1012
TOTAL VOCs	ND	ND
1,1-DICHLOROETHANE	4.3	ND

1995	SOIL (mg/kg)	GROUNDWATER (ug/L)
CHEMICAL	JF-SB04-1618	JF-TW04
TPH-DRO	1.6J	NA
TPH-GRO	ND	NA
VOCs	NA	ND

1994	SOIL GAS (ug/L)
CHEMICAL	SG-JFSL-2
TOTAL VOCs	ND
1,1-DICHLOROETHANE	2.0

1995	SOIL (mg/kg)	GROUNDWATER (ug/L)
CHEMICAL	JF-SB06-1618	JF-TW06
TPH-DRO	ND	NA
TPH-GRO	ND	NA
VOCs	NA	ND

NOTE:

METHYLENE CHLORIDE, ACETONE,
AND 1,2-DICHLOROETHANE WERE
NOT REPORTED AS THEY WERE
DETECTED IN ASSOCIATED
LABORATORY AND/OR FIELD
QA/QC SAMPLES.

LEGEND

- ⊗ CESPOOL MANHOLE
• SOIL GAS SAMPLE (1994)
⊙ SOIL GAS SAMPLE AND
SOIL BORING (1994)
⊕ TEMPORARY WELL (1995)
- NA NOT ANALYZED
ND NOT DETECTED
DRO DIESEL RANGE ORGANICS
GRO GASOLINE RANGE ORGANICS

POSITIVELY DETECTED ANALYTICAL RESULTS
1994 AND 1995 SAMPLING EVENTS
JET FUEL SYSTEM LAB (06-11)
NWIRP, CALVERTON, NEW YORK

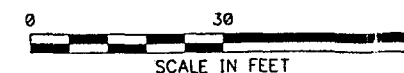


FIGURE 4-3

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Five subsurface soil samples were collected from soil borings drilled at the Jet Fuel Systems Lab for chemical analyses. All of the samples were obtained from the 16 foot to 18 foot depth. A positive detection of TPH was noted in one of the five samples collected (JF-SB04-1618) at a concentration of 1.6 mg/kg.

Groundwater samples were collected from five temporary monitoring wells installed around the cesspools located at the Jet Fuel Systems Lab. Methylene chloride was detected in samples from all of the wells; acetone was detected in 4 of 5 samples; and 1,2-dichloroethane was detected in 1 of 5 samples; however, these compounds were also detected in field and/or laboratory QA/QC blanks. As a result, these chemicals are not believed to be present in this site's groundwater, but are the result of laboratory contamination. No other positive detections of VOCs were noted in the groundwater samples.

4.4.4 Summary of Northrop Grumman's Phase II, Site Assessment Area 4 Results

Northrop Grumman conducted a Phase II Site Assessment in this area, (Grumman 1996). This investigation did find petroleum and freon contamination in and near the Jet Fuel Systems Laboratory. In particular, the contamination was identified near the Contaminated Fuel Leaching Chamber and Contaminated Fuel Handling System, which are both located in the general area of the former cesspools.

The results from the Northrop Grumman study indicate deep soil contamination near the Contaminated Fuel Leaching Chamber, with methylene chloride (160 ug/kg), TPH (3,900 mg/kg), and jet fuel (16,000 mg/kg) being detected. At a sample location near the Contaminated Fuel Handling System, toluene (2500 ug/kg), total VOCs (33,666 ug/kg), xylenes (28,000 ug/kg), naphthalene (46,000 ug/kg), and 2-methylnaphthalene (110,000 ug/kg) were detected in shallow soils.

However, during the Northrop Grumman study, soil contamination was not detected in two nearby sample locations. Also, as noted in Section 4.4.3, soil contamination was not detected in samples collected during the RFA addendum field work, even though some samples were collected at the same depth and within 50 feet of the noted contamination. In addition, similar contaminants were not detected in groundwater samples from the immediate cesspool area.

The Northrop Grumman study did find groundwater contamination in a monitoring well located east of the Jet Fuel Systems Laboratory. The monitoring well is located just south of Installation Restoration Site 7 - Fuel Depot Area. Groundwater contaminants detected in this monitoring well include ethylbenzene (8 ug/l), xylenes (99 ug/l), 1,2,4 trichlorobenzene (38 ug/l), and freon 113 (1,100 ug/l). The contamination

detected in this area could be attributable to the Fuel Depot site, (which except for freon, has similar contaminants) and/or the Jet Fuel Systems Laboratory Site.

4.5 FATE AND TRANSPORT

Soils from the site were tested for TPH as an indicator of fuel contamination. Fuels that may be found at the site include jet fuel and diesel. These fuels have a low solubility in water and will float on the surface of groundwater. In bulk, the fuels will form a floating free-product layer that does not move quickly through soils and will eventually biodegrade. These fuels consist of a variety of individual organic compounds, with varying properties.

Volatile organic compounds found in fuels, (such as toluene and ethylbenzene), and freon, are more water soluble than the bulk fuel, and will leach from the fuels to water. Once in the soil, they will migrate with precipitation infiltration into groundwater. Fuel-related compounds, and to a lesser extent freon, will biodegrade naturally in soils and groundwater. Also, the compounds will evaporate into the air, where they will undergo photochemical degradation.

Semi-volatile organics components of fuels are generally less water soluble than volatile organic compounds and do not migrate through the environment as fast. Even though they also biodegrade naturally overtime, they do not degrade as fast as many of the volatile organics compounds.

4.6 CONCLUSIONS AND RECOMMENDATIONS

1. Although contamination was not detected during the RFA Addendum - Sampling Visit, petroleum contamination was found in the soils, and freon was found in the groundwater during the Northrop Grumman Phase II Site Assessment. TPH and specific fuel-related VOCs were found in the soils at the soil/ groundwater interface at concentrations that would suggest the presence of a floating free product layer. Also, freon and xylenes were found in the groundwater at an adjacent area at a maximum concentration of 1100 ug/l and 99 ug/l, respectively. For comparison, the state action level for these compounds in drinking water is 5 ug/l. This groundwater contamination may also be associated with the Fuel Depot Area Site.
2. The soil contamination is localized to several areas around former waste oil systems at the Jet Fuels Systems Laboratory. Based on the absence of detectable levels of chemicals in several soil samples, not all areas within this Site appear to have been impacted.

3. There appears to be sufficient data available to precede to a remediation, however some additional testing may be required to confirm the extent of contaminants.

5.0 ENGINE TEST HOUSE (SITE 10B)

5.1 SITE DESCRIPTION/ENVIRONMENTAL SETTING

The Engine Test House (Site 10B) is located in the south-central portion of the facility (Figure 1-2). This area was initially evaluated as part of the cesspool/leachfield investigation. However, this investigation was not conclusive as to the presence or absence of contamination.

The area is surrounded to the south and west by sparse woods and open grassy areas. Several thousand feet to the north lies the Fuel Calibration area and adjacent to this area to the east is the Engine Test House where aircraft engines were fueled and tested (Figure 5-1).

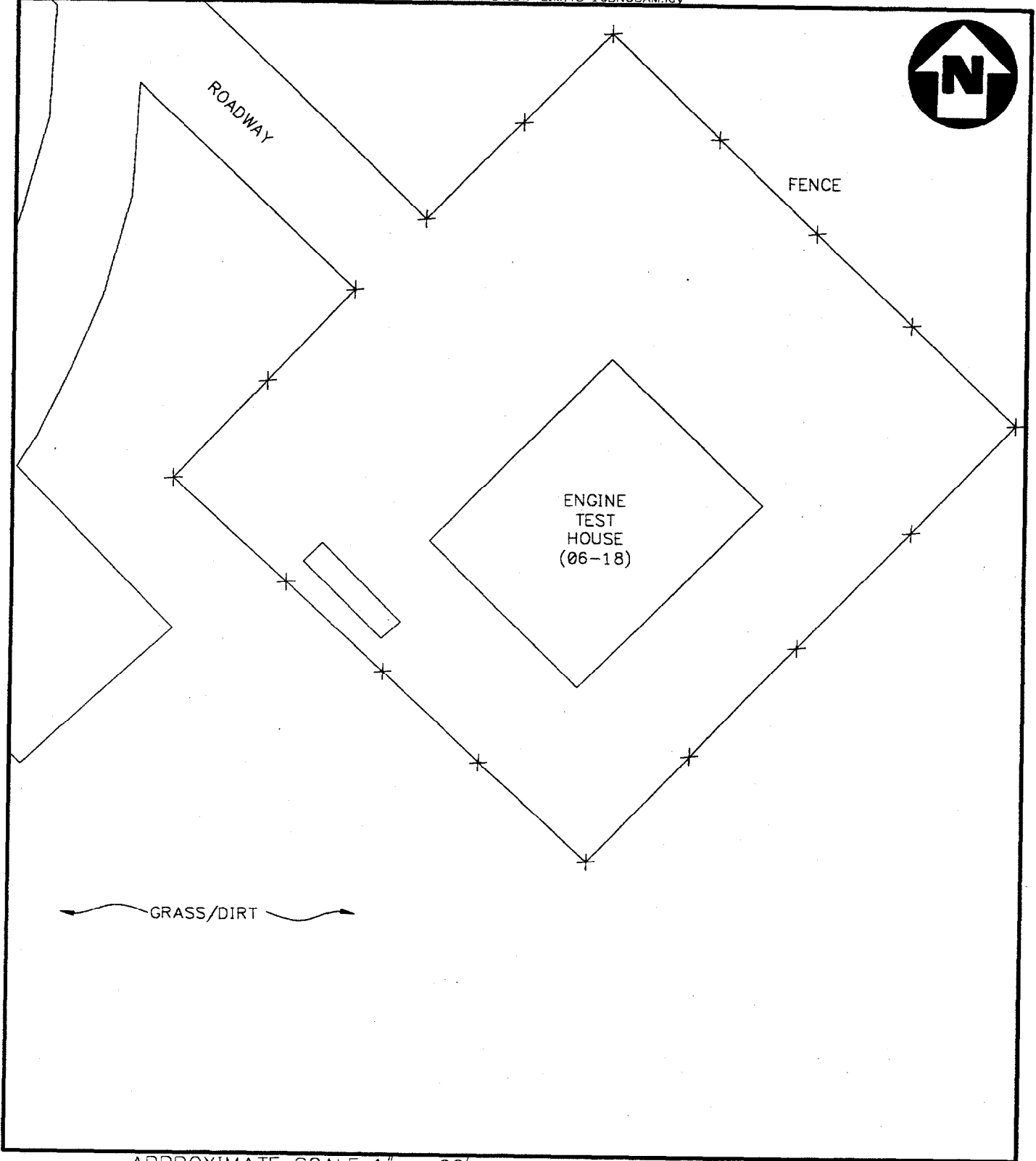
Recent activities in this area included the removal of an underground fuel storage tank immediately adjacent to the area of investigation.

5.2 SAMPLING OBJECTIVES

The primary sampling objectives at the Engine Test House were to determine if VOC contamination was present in the groundwater and/or if petroleum hydrocarbon contamination was present in the site soils. If contamination was present, a second objective was to determine an approximate aerial extent of contamination. Sampling activities during the initial RFA - Sampling Visit concluded that low level VOC contamination was present in the soils near the cesspools. Grumman conducted floating free product recovery from the groundwater up to early 1996.

5.3 SAMPLING ACTIVITIES

Soil and groundwater sampling activities were performed at the Engine Test House (Site 10B) during the fieldwork for RFA - Sampling Visit Addendum. Seven soil borings were installed and seven subsurface soil samples were collected for chemical analysis. Seven groundwater samples were collected from temporary monitoring wells installed in each soil boring. All sampling, sample handling, and decontamination activities were performed in accordance with the initial RFA - Sampling Visit Work Plan (HNUS, 1993a) and RFI Work Plan (HNUS 1993b). Boring logs, sample log sheets and Chain-of-Custody records are provided in Appendices A, B, and C, respectively. Laboratory analytical data is provided in Appendix E.



APPROXIMATE SCALE 1" = 60'

SITE MAP
SITE 10B - ENGINE TEST HOUSE (06-18)
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

FIGURE 5-1

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5.3.1 Soil Boring Installation and Subsurface Soil Sampling

Seven soil borings (ETH-SB01 to ETH-SB07) were installed at the Site 10B-Engine Test House Area, and seven subsurface soil samples were collected for chemical analysis. Soil boring locations are shown in Figure 5-2. The soil borings were advanced using hollow stem augering techniques. Two split-spoon samples were collected from each boring at the soil/groundwater interface except for borings ETH-SB01, ETH-SB03, and ETH-SB07,. For these borings, only one split-spoon sample was collected at the soil/groundwater interface. Each sample was inspected for evidence of contamination (staining, sheen, or odor). The headspace of each sample was field screened with an FID organic vapor analyzer. Petroleum odors and FID readings ranging from 94-228 ppm were noted in ETH-SB01 and ETH-SB06. No other FID readings were noted in the samples obtained. Sample lithology, recovery length, color, and headspace readings were recorded on boring logs. The soil borings were backfilled with the drill cuttings after groundwater samples had been collected from each boring.

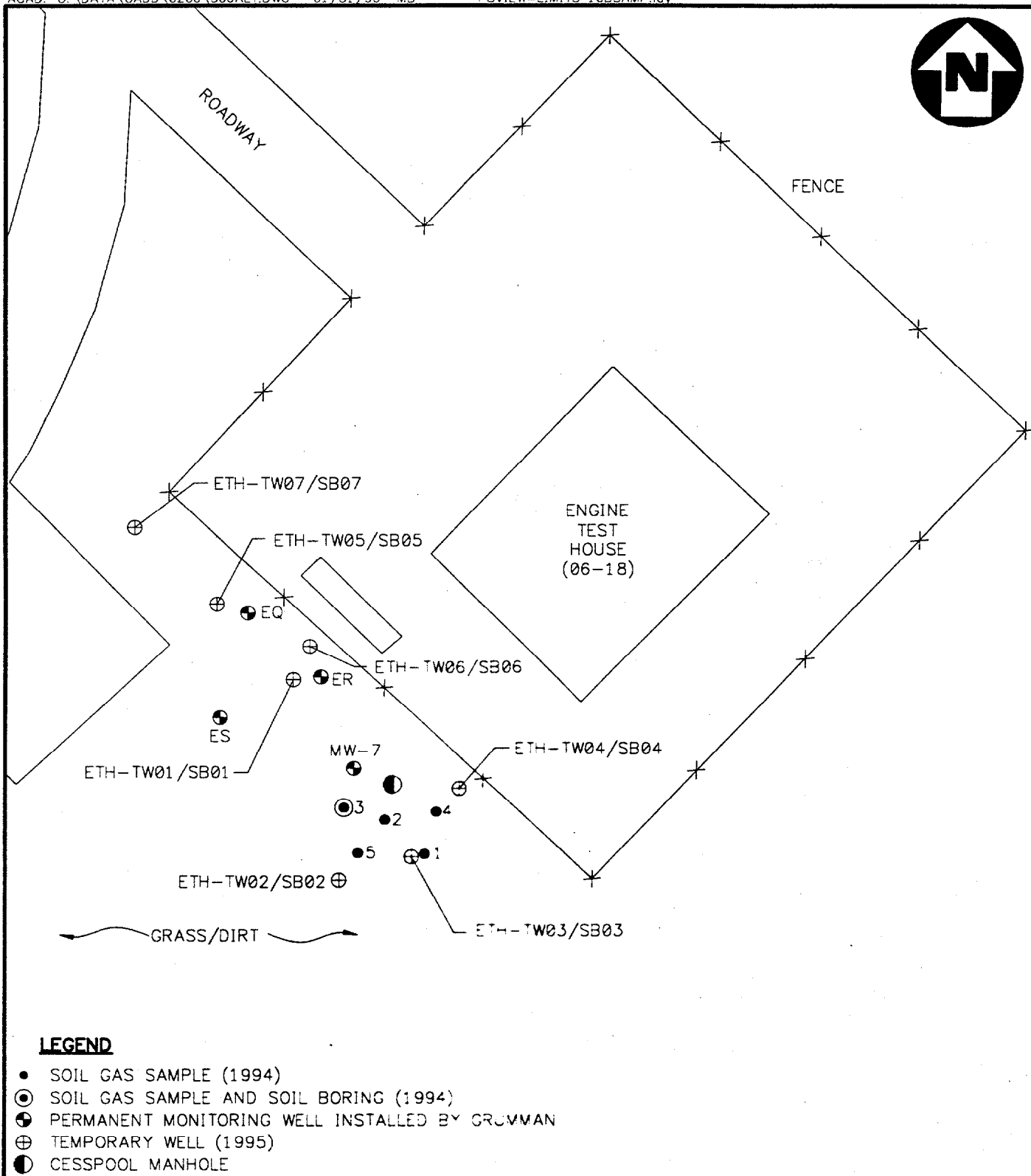
Seven subsurface soil samples were sent to RECRA and analyzed for diesel and gasoline range petroleum hydrocarbons. One subsurface soil sample from each split spoon sample collected immediately above the soil/groundwater interface was selected for chemical analysis with a preference for stained soils and/or elevated FID readings, if observed..

5.3.2 Temporary Monitoring Well Installation and Groundwater Sampling

Each of the seven soil borings (ETH-SB01 to ETH-SB07) were converted to temporary monitoring wells (ETH-TW01 to ETH-TW07) at the Engine Test House site. The temporary monitoring wells were installed through the drilling augers after they had been advanced to approximately 1 to 2 feet below the water table in each soil boring. The temporary wells were constructed of 2-inch diameter PVC well casing and screen. The well screen was 10 feet long with .020-inch slots. The drilling augers were withdrawn approximately 5 feet, and the natural formation was allowed to backfill the annulus around the well screen. Three well casing volumes of groundwater were purged from each well prior to sampling. The groundwater samples were sent to Nytest and analyzed for Target Compound List (TCL) volatiles plus Freon 113.

5.4 RESULTS OF ADDITIONAL SAMPLING VISIT

The following sections describe the results of the additional sampling activities at Site 10B-Engine Test House Area.



APPROXIMATE SCALE 1" = 60'

SAMPLING LOCATIONS

1994 AND 1995 SAMPLING EVENTS

SITE 10B - ENGINE TEST HOUSE (06-18)

RFA ADDENDUM

NWIRP, CALVERTON, NEW YORK

FIGURE 5-2

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5.4.1 Geology

A single soil boring was installed during the initial RFA - Sampling Visit at the Engine Test House to a depth of approximately 7 feet. Based on this data and the soil boring data from the RFA Addendum sampling visit, the site is underlain by fine sand to 12 feet, the total depth drilled at the site.

5.4.2 Hydrogeology

During the fieldwork for the RFA - Sampling Visit Addendum in November 1995, the groundwater was encountered at approximately 10 feet below ground surface. The groundwater flow direction is to the southeast, based on the RFI report (HNUS 1995b).

5.4.3 Analytical Results

Samples collected for chemical analyses during the RFA Addendum sampling included 7 subsurface soil samples at the soil/groundwater interface and 7 groundwater samples. Soil samples were analyzed for gasoline range and diesel range TPH and groundwater samples were analyzed for TCL volatiles and Freon 113. The groundwater samples were analyzed by a local laboratory (Nytest) for quick turnaround. Two of the 7 samples (ETH-TW01 and ETH-TW03) were also sent to a fixed-base laboratory (RECRA) for confirmation analyses. All soil samples were sent to RECRA for testing. The results of the sampling are presented in Table 5-1 and on Figure 5-3.

The results of the soil sampling showed positive detections of TPH in 6 of the 7 samples analyzed during the RFA Addendum sampling at concentrations ranging from 1.5 mg/kg to 11,300 mg/kg. The highest concentrations of TPH were found in the samples collected from ETH -SB01-0810 (11,300 mg/kg) and ETH -SB06-0911 (876 mg/kg). These borings were drilled in the vicinity of an underground storage tank that was recently removed. All remaining detections for TPH were noted to be below the action level of 10 mg/kg.

Groundwater samples were obtained from temporary monitoring wells installed within each of the soil borings at the Engine Test House Site. Ethylbenzene (200 ug/l) and total xylene (900 ug/l) were detected in the sample from ETH-TW06 at concentrations which exceeded the New York State action levels for drinking water (5 ug/l). These samples were collected from the temporary monitoring wells located closest to the area of the underground storage tank removal. Low levels of total xylene (7 ug/l, RECRA and 9 ug/l, Nytest) were detected in the samples collected from ETH-TW01. Methylene chloride detected in all

TABLE 5-1

**ANALYTICAL RESULTS - 1995 SAMPLE EVENT
SITE 10B - ENGINE TEST HOUSE
NWIRP CALVERTON, NEW YORK**

Groundwater (ug/l)

Compound	MDL RECRA/ NYTEST	Action Level ¹	ETH- TWO1		ETH- TW02	ETH- TW03		ETH- TW04	ETH- TW05	ETH- TW06	ETH- TW07
			RECRA	NYTEST	NYTEST	RECRA	NYTEST	NYTEST	NYTEST	NYTEST	NYTEST
Methylene chloride	1.4/2.0	5		6 B	6 B		6 B	5 B	9 B	5 B	8 B
Acetone	2.4/5.0	5		18 B	5 B		6 B	4 B	24 B	13 B	
1,2-Dichloroethane	1.2/1.0	5							14 B		
2-Butanone	2.6/1.4	5	16	19 B							
2-Hexanone	3.5/1.4	5		3 J							
Ethylbenzene	0.9/0.7	5								200	
Total Xylenes	1.5/1.3	5	7	9						900 D	

5-6

Soils (mg/kg)

Compound	Detection Limit	Action Level ²	ETH- SB01- 0810		ETH- SB02- 0810	ETH- SB03- 0810		ETH- SB04- 0810	ETH- SB05- 0911	ETH- SB06- 0911	ETH- SB07- 0911
TPH - Gasoline Range	2.0	10	1,300		1.5 J	6.7		1.1		16	
TPH - Diesel Range	2.0	10	10,000			2.2		2.3	2.0	860	

MDL - Method Detection Limit

Blank - Indicates that the chemical was not detected.

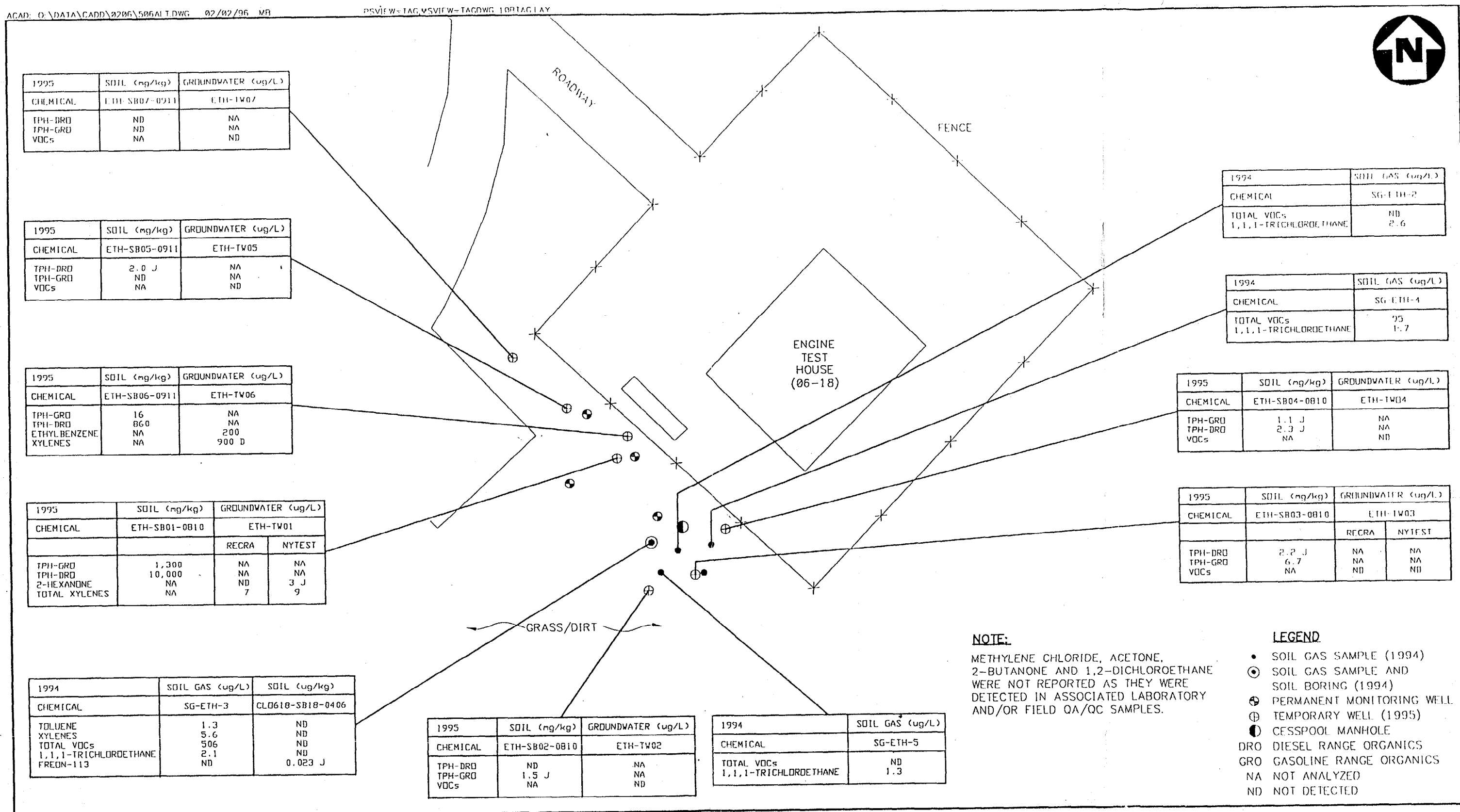
B - Indicates that compound was also detected in field or lab QA/QC blank sample. Therefore, chemicals with their results qualified by a "B" are not likely to be present in the sample.

D - Result is from a sample diluted in the laboratory, because of high chemical concentration.

J - For 2-hexanone, the "J" indicates the compound was detected, however the reported result is below the Contract Required Quantitation Limit (CRQL), which is 10 ug/l.

1. - NYS Public Water Supplies, 10 NYCRR Part 5.

2. - Action level for TPH is based on New York State Technology and Remediation Series, Petroleum-Contaminated Soil Guidance (STARS Memo #1).



POSITIVELY DETECTED ANALYTICAL RESULTS
1994 AND 1995 SAMPLING EVENTS
SITE 10B - ENGINE TEST HOUSE (06-18)
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

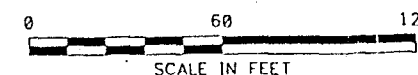


FIGURE 5-3

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of the samples; acetone detected in 6 of 7 samples; and 1,2-dichloroethane and 2-butanone detected in one sample each were also detected in field and/or laboratory QA/QC samples. As a result, these chemicals are not believed to be present in the site's groundwater, but are the result of laboratory contamination. No other positive detections of VOCs were noted.

5.5 FATE AND TRANSPORT

Soils from the site were tested for TPH as an inclusive indicator of fuel contamination. Fuels that may be found at the site include jet fuel, diesel, and to a limited extent gasoline. These fuels have a low solubility in water and will float on the surface of groundwater. In bulk, the fuels will form a floating free-product layer that does not move quickly through soils and will biodegrade, although slowly. These fuels consist of a variety of individual organic compounds, with varying properties.

Volatile organic compounds found in fuels, such as toluene and ethylbenzene, are more water soluble than the bulk fuel, and will leach from the fuels to water. Once in the water, they will migrate with precipitation infiltration and groundwater. These compounds will biodegrade naturally in soils and groundwater. Also, the compounds will evaporate into the air, where they will undergo photochemical degradation.

Semi-volatile organics components of fuels are generally less water soluble than volatile organic compounds and do not migrate through the environment as fast. Even though they also biodegrade naturally overtime, they do not degrade as fast as many of the volatile organics compounds.

5.6 CONCLUSIONS AND RECOMMENDATIONS

1. Petroleum-based contamination were found in the soils and groundwater at this site. TPH were found in the soils at the soil/groundwater interface at concentrations that indicate the presence of a floating free product layer. Also, ethylbenzene and xylenes were found in the groundwater at a maximum concentration of 900 ug/l and 200 ug/l, respectively. For comparison, the state action level for these compounds in drinking water is 5 ug/l.
2. The location of the contamination appears to be localized to a relatively small area around two of the soil borings. Soils borings to the southeast (hydraulically downgradient) were noted to have only low-levels of TPH in the soils (1.5 to 8.9 mg/kg) and non-detected levels of VOCs in the groundwater.

3. Although the extent of contamination has not been completely delineated, there is sufficient data available to proceed to a removal action.

6.0 SOUTHERN AREA

6.1 SITE DESCRIPTION/ENVIRONMENTAL SETTING

The Southern Area is situated south and southeast of the Fuel Calibration Area (Site 6A) and the Engine Test House (Site 10B) along the perimeter road as shown on Figure 6-1. The area investigated extended from the perimeter road north and northwest towards these sites. This area is just north, and hydraulically upgradient of a Suffolk County monitoring well, which is reported to be contaminated with chlorinated VOCs. The primary chemicals detected in this monitoring well were TCA, dichloroethane (DCA), and chloroethane (CA). The maximum concentration of a VOC detected in the Suffolk County well was 120 ug/l of TCA in 1980. However, since 1991, the maximum concentration of TCA detected was 13 ug/l. The maximum concentration of DCA detected was 8 ug/l in 1987. DCA has not been detected in the Suffolk County since 1991. Chloroethane was detected at 4 ug/l in 1993. Overall, there was no observed trend with the data, except that more recent data is generally lower than the historical data. The area is bordered to the south by the facility perimeter fence and to the north, east, and west by a mix of patchy wood lots and natural shallow depressions.

6.2 SAMPLING OBJECTIVES

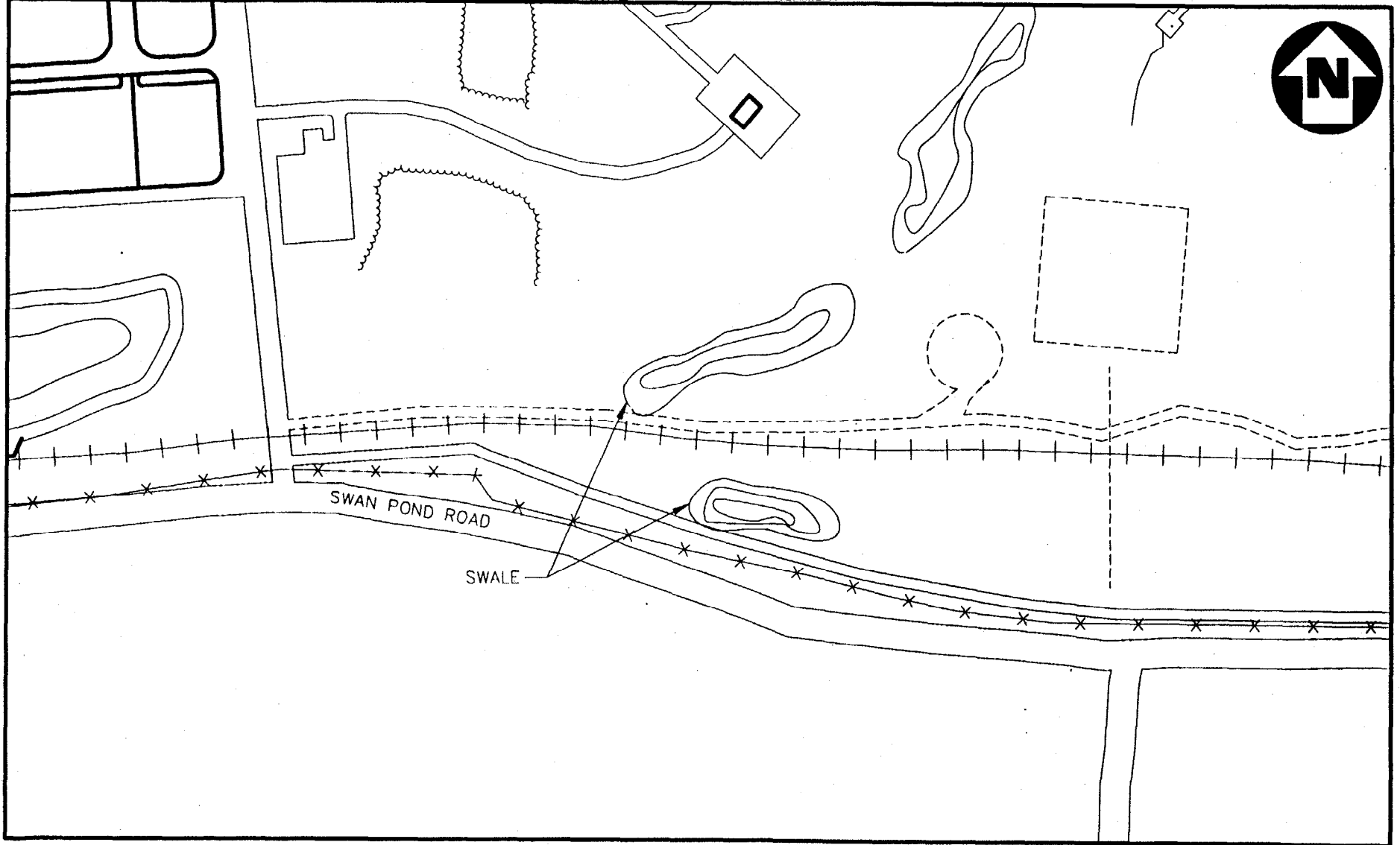
The primary objective of the Southern Area investigation was to determine whether offsite groundwater contamination detected in the Suffolk County well, which is hydraulically downgradient, was present on the Navy's property. To accomplish this objective, temporary monitoring wells were drilled and sampled for VOCs. If VOCs were detected, a secondary objective was to determine the source of the contamination.

6.3 SAMPLING ACTIVITIES

During the fieldwork for the RFA - Sampling Visit Addendum, seven groundwater samples were collected from temporary monitoring wells installed at the Southern Area, and one groundwater sample was collected from one permanent monitoring well installed at the Southern Area. A second monitoring well had been proposed, however due to the absence of contamination during the temporary monitoring well program only one well was necessary. All sampling, sample handling, and decontamination activities were performed in accordance with the RFI Work Plan (HNUS 1993b). Boring logs, sample log sheets, Chain-of-Custody records, and monitoring well construction sheets are provided in Appendices A, B, C, and D, respectively. Laboratory analytical data is provided in Appendix E.

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6-2



SITE MAP
SOUTHERN AREA
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

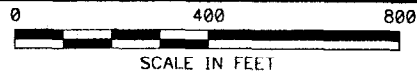


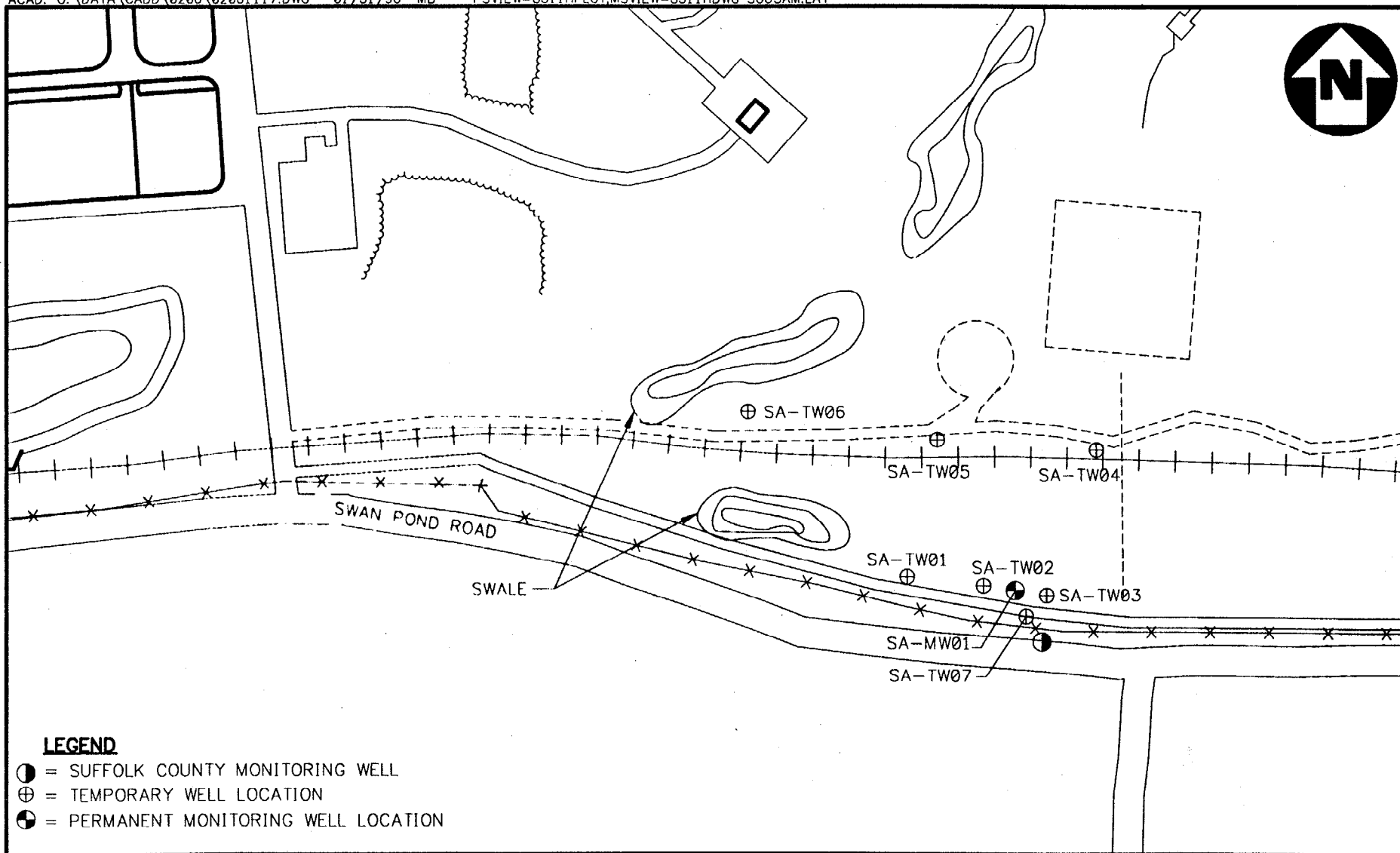
FIGURE 6-1

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6-3



SAMPLING LOCATIONS
SOUTHERN AREA
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

0 400 800
 SCALE IN FEET

FIGURE 6-2

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6.3.1 Temporary Monitoring Well Installation and Groundwater Sampling

Seven groundwater samples were collected from seven temporary monitoring wells (SA-TW01 to SA-TW07) installed at the Southern Area. Temporary monitoring well locations are shown in Figure 6-2. The borings were advanced using hollow stem augering techniques. Drill cutting lithology, color, and FID organic vapor analyzer readings were recorded on boring logs. No FID readings were noted in any of the samples obtained. The temporary monitoring wells were installed through the drilling augers after they had been advanced to approximately 2 to 6 feet below the water table in each soil boring. The temporary wells were constructed of 2-inch diameter PVC well casing and screen. The well screen was 10 feet long with .020-inch slots. The drilling augers were withdrawn approximately 2 to 8 feet, and the natural formation was allowed to backfill the annulus around the well screen. Note that the Suffolk County well is screened at a depth of 13 to 23 feet below the water table. Three well casing volumes of groundwater were purged from each well prior to sampling. The groundwater samples were sent to Nytest and analyzed for TCL volatiles plus Freon 113. Groundwater analytical results are provided in Section 6.4.3. The well borings were backfilled with the drill cuttings after groundwater samples had been collected and the temporary well casing withdrawn.

6.3.2 Permanent Monitoring Well Installation and Groundwater Sampling

One permanent monitoring wells (SA-MW01) was installed at the Southern Area. The permanent monitoring well location is shown on Figure 6-2. The well boring was advanced with 10-inch outside diameter hollow stem augers. Four-inch diameter, Schedule 40 PVC well casing and screen were installed through the augers after they had been advanced to the desired depth. The well screen was 10 feet long with .020-inch slots. The top of the well screen was placed approximately 1 foot above the water table. The annulus around the well screen was backfilled with clean, Morie #2 silica sand to approximately 1 foot above the well screen. A 1½ foot bentonite seal was placed on top of the sand filter pack. Cement grout was backfilled from the top of the seal to approximately ½ feet below ground surface. A locking steel casing was cemented in place around the well casing at the surface. Monitoring well construction sheets are provided in Appendix D. The drill cuttings were spread out around the wells.

The monitoring well was developed a minimum of 24 hours after installation with an air lift pump until the purged water cleared to a turbidity of less than 50 NTU and pH, specific conductivity, temperature, salinity, and dissolved oxygen parameters stabilized. All development water was containerized.

One groundwater sample was collected from the permanent monitoring well SA-MW01. Three well casing volumes of groundwater were purged from SA-MW01 prior to sampling. pH, specific conductivity, temperature, salinity, turbidity, and dissolved oxygen parameters were measured after each well volume during purging (see Appendix B). The groundwater sample was sent to RECRA and analyzed for TCL volatiles plus Freon 113.

6.4 RESULTS OF ADDITIONAL SAMPLING VISIT

The following sections describe the results of the additional sampling activities at the Southern Area.

6.4.1 Geology

The Southern Area was not investigated during the initial RFA - Sampling Visit. Based on data from the seven soil borings (SA-TW01 to ECM-TW07) and one permanent monitoring well (SA-MW01) installed during the RFA - Sampling Visit Addendum, the Southern Area is underlain by fine sand with trace amounts of fine gravel and very trace silt to 15.5 feet, the maximum depth drilled at the site.

6.4.2 Hydrogeology

During the fieldwork for the RFA - Sampling Visit Addendum in November 1995, the groundwater was encountered at approximately 3.5 to 8 feet below ground surface. The groundwater flow direction is to the southeast, based on the RFI report (Navy 1995).

6.4.3 Analytical Results

Samples collected for chemical analyses during the RFA Addendum sampling at the Southern Area included 8 groundwater samples to be analyzed for TCL Volatiles and Freon 113. Seven of the samples were sent to a local laboratory (Nyttest) for quick turnaround, while one sample was sent to a fixed base laboratory (RECRA) for confirmatory testing. The results of the sampling are presented in Table 6 -1 and on Figure 6-3.

Positive detections were noted in 3 of the 8 groundwater samples collected from the Southern Area. Chloromethane (2 ug/l) was detected in the samples collected from wells SA-TW03 and SA -TW06. Carbon disulfide (1 ug/l) was detected in the sample collected from SA-TW01. These positive results are below New York State action levels for drinking water (5 ug/l). Positive detections of methylene chloride, acetone, and/or 1,2-dichloroethane were noted in all of the samples analyzed by Nyttest at concentrations

TABLE 6-1

**ANALYTICAL RESULTS - 1995 SAMPLE EVENT
SOUTHERN AREA
NWIRP CALVERTON, NEW YORK**

Groundwater (ug/l)

Compound	MDL	Action Level ¹	SA-TW01	SA-TW02	SA-TW03	SA-TW04
			NYTEST	NYTEST	NYTEST	NYTEST
Chloromethane	2.7	5			2 J	
Methylene chloride	2.0	5	4 B	4 B	5 B	6 B
Acetone	5.0	5	25 B	20 B	25 B	16 B
Carbon Disulfide	0.7	5	1J			
1,2-Dichloroethane	1.0	5	11 B	15 B	14 B	14 B

Groundwater (ug/l)

Compound	MDL RECRA/ NYTEST	Action Level ¹	SA-TW05	SA-TW06	SA-TW07	SA-GW01
			NYTEST	NYTEST	NYTEST	RECRA
Chloromethane	1.1/2.7	5		2 J		
Methylene chloride	1.4/2.0	5	6 B	6 B	16 B	
Acetone	2.4/5.0	5	16 B	17 B	4 B	
1,2-Dichloroethane	1.2/1.0	5	13 B	16 B		

MDL - Method Detection Limit

Blank - Indicates that the chemical was not detected.

B - Indicates that compound was also detected in field or lab QA/QC blank sample. Therefore, chemicals with their results qualified by a "B" are not likely to be present in the sample.

J - For chloromethane and carbon disulfide, the "J" indicates the compound was detected, however the reported result is below the Contract Required Quantitation Limit (CRQL), which is 10 ug/l for both of these compounds.

1 - NYS Public Water Supplies, 10 NYCRR Part 5.

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6-7



	GROUNDWATER (ug/L)
CHEMICAL	SA-TW06
CHLOROMETHANE	2 J

	GROUNDWATER (ug/L)
CHEMICAL	SA-TW05
VOCs	ND

	GROUNDWATER (ug/L)
CHEMICAL	SA-GW01
VOCs	ND

	GROUNDWATER (ug/L)
CHEMICAL	SA-TW04
VOCs	ND

	GROUNDWATER (ug/L)
CHEMICAL	SA-TW03
CHLOROMETHANE	2 J

	GROUNDWATER (ug/L)
CHEMICAL	SA-TW07
VOCs	ND

	GROUNDWATER (ug/L)
CHEMICAL	SA-TW01
CARBON DISULFIDE	1 J

	GROUNDWATER (ug/L)
CHEMICAL	SA-TW01
VOCs	ND

LEGEND

- SUFFOLK COUNTY MONITORING WELL
- ⊕ TEMPORARY WELL LOCATION
- ⊙ PERMANENT MONITORING WELL LOCATION
- ND NOT DETECTED
- NA NOT ANALYZED
- DRO DIESEL RANGE ORGANICS
- GRO GASOLINE RANGE ORGANICS

POSITIVELY DETECTED ANALYTICAL RESULTS

**SOUTHERN AREA
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK**

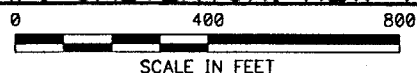


FIGURE 6-3

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ranging from 4 ug/l to 25 ug/l. However these compounds were also detected in field and/or laboratory QA/QC samples. As a result, these chemicals are not believed to be present in this site's groundwater, but are the result of laboratory contamination. No positive results were detected in the confirmation sample (SA-GW01) analyzed by RECRA.

6.5 FATE AND TRANSPORT

Contaminants were not detected at this site.

6.6 CONCLUSIONS AND RECOMMENDATIONS

1. Chloromethane at a maximum concentration of 2 ug/l was the only VOC reliably detected in the southern area. This chemical is similar to that found in the county well.
2. Based on these findings, no additional action is recommended for this area under the IR Program.

7.0 GOLF COURSE

7.1 SITE DESCRIPTION/ENVIRONMENTAL SETTING

The Swan Lake Golf Course is situated directly south of the Northrop Grumman facility south gate as shown on Figure 1-2. The golf course is located offsite and hydraulically downgradient of the facility. The golf course utilizes local groundwater as a source of irrigation for the course as well as a potable water supply. In addition there are several surface water bodies in the area including Swan Pond and local water hazards on the course (Figure 7-1).

7.2 SAMPLING OBJECTIVES

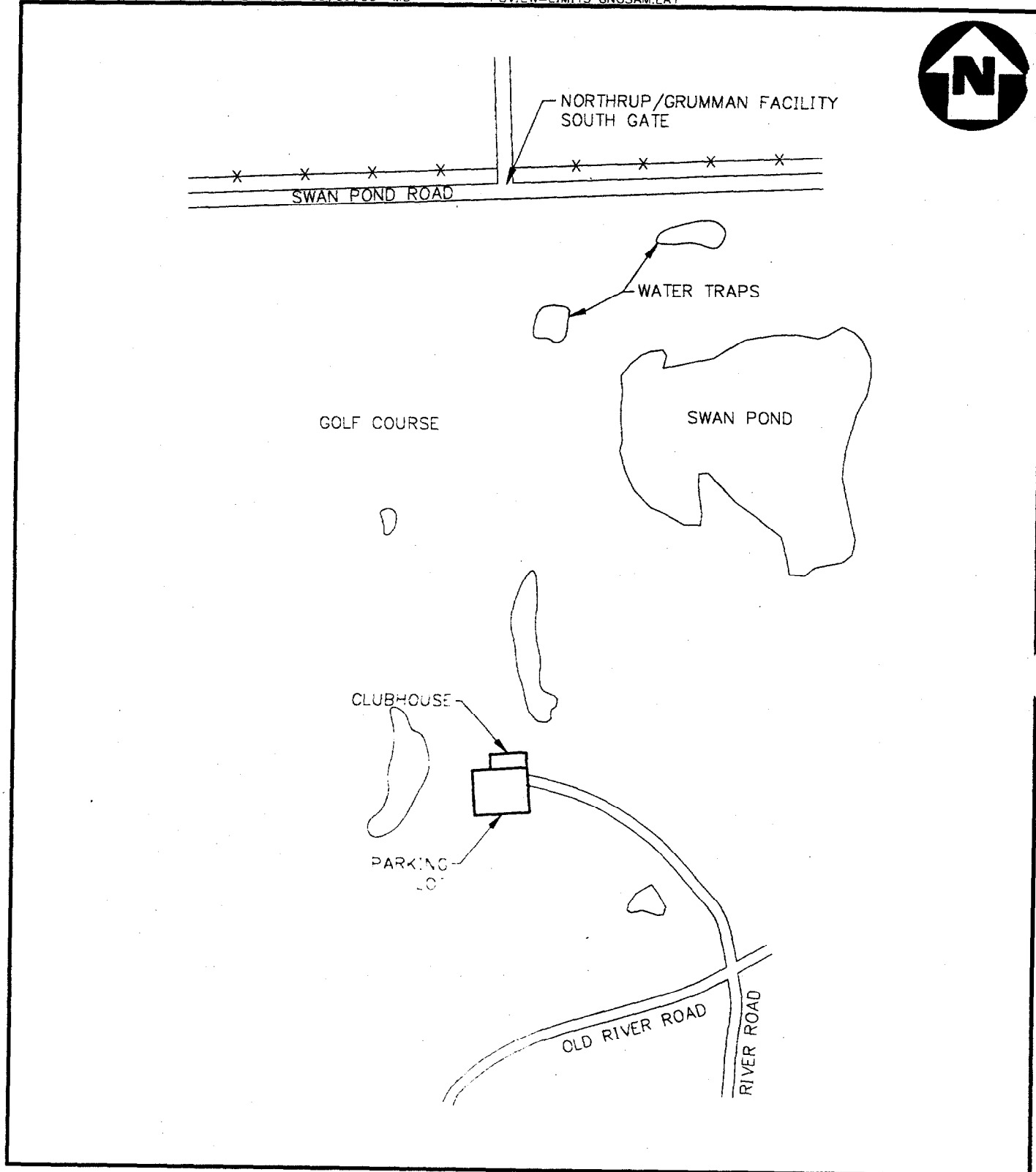
The RCRA Facility Investigation dated August 1995, identified chloroethane at 130 ug/l located at the southern border of the Navy's property. Although it is not yet known how far offsite this contamination may be, the Navy was concerned that there could be an immediate impact to the golf course which is the closest potential downgradient receptor to this contamination. Therefore, samples were collected of the groundwater and surface water at the golf course to assess whether there have been any immediate impacts as a result of the contamination found at the property boundary.

Another objective of the study had been to test the irrigation well water. However this well had been shut down for the winter and could not be sampled.

The Navy does recognize and accept the need to identify how far offsite the chloroethane contamination has migrated. However, this was not one of the goals of the RFA Addendum. The additional work that is necessary will be accomplished as part of subsequent work conducted at Site 2 when funding becomes available and offsite access agreements to conduct fieldwork have been obtained.

7.3 SAMPLING ACTIVITIES

One groundwater sample, one surface water sample, and one seep sample were collected at the Swan Lake Golf Course. All sampling, sample handling, and decontamination activities were performed in accordance with the initial RFA - Sampling Visit Work Plan (HNUS 1993a). Sample log sheets and Chain-of-Custody records are provided in Appendices B and C, respectively. Laboratory analytical data is provided in Appendix E.



APPROXIMATE SCALE 1" = 800'

SITE MAP
GOLF COURSE
RFA ADDENDUM
NWIRP, CALVERTON, NEW YORK

FIGURE 7-1

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7.3.1 Groundwater Sampling

One groundwater sample was collected from the potable water well tap in the Swan Lake Golf Course clubhouse. The groundwater sample location is shown on Figure 7-2. The water line was purged for approximately 10 minutes at a flow of approximately ¼ gallon per minute. The sample was collected by direct bottle fill. The groundwater sample was sent to RECRA Environmental, Inc. of Amherst, New York, and analyzed for TCL volatiles plus Freon 113.

7.3.2 Surface Water Sampling

One surface water sample was collected from a water body on the Swan Lake Golf Course. The sample location is shown on Figure 7-2. The sample location was the first water body encountered on the Swan Lake Golf Course southeast of FT-MW05-I and FT-MT-MW05-S. The sample was collected by direct bottle fill. The surface water sample was sent to RECRA and analyzed for TCL volatiles plus Freon 113.

7.3.3 Seep Sampling

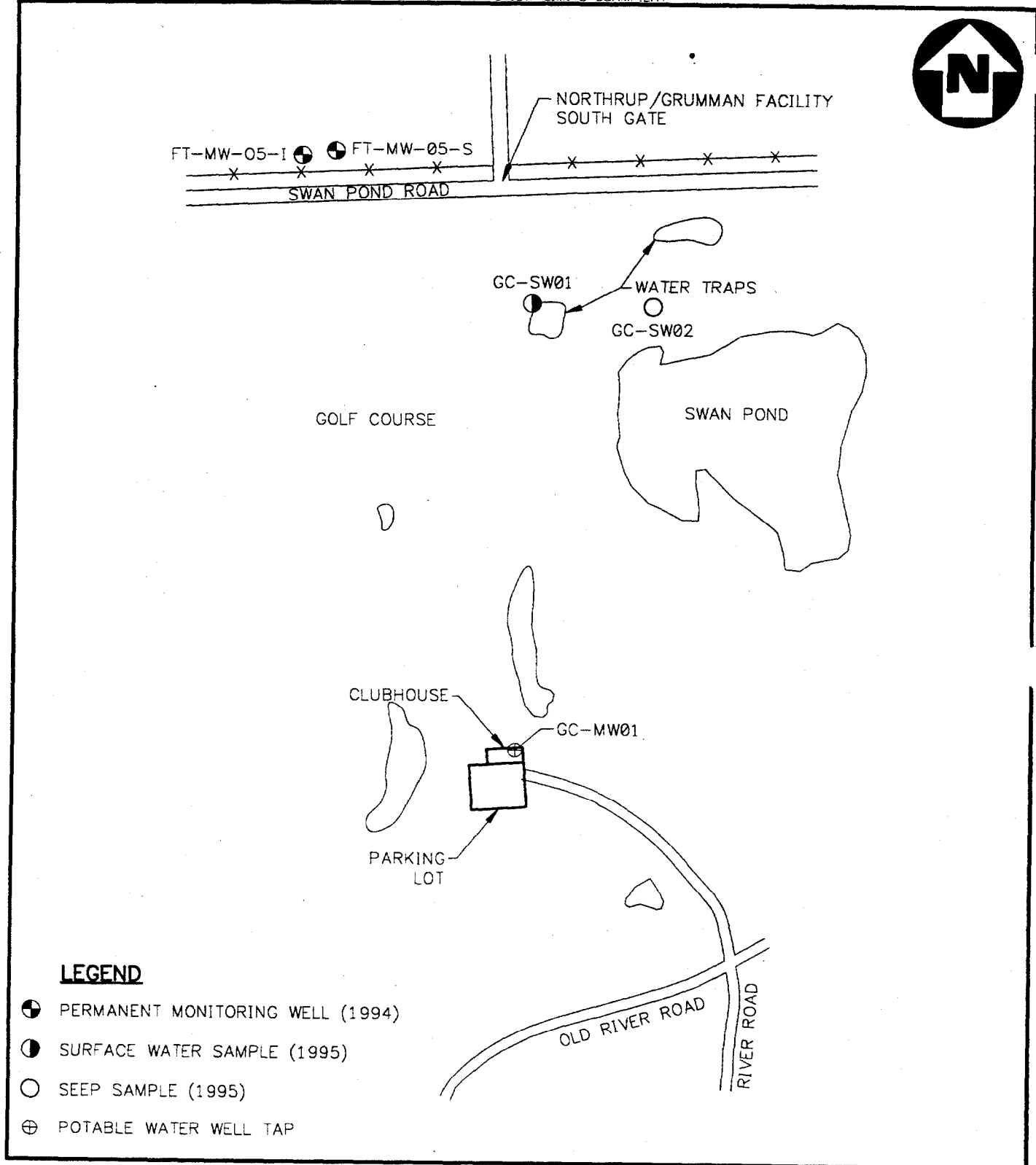
One seep sample (CG-SW02) was collected from the northwestern most seep that drains into the Swan Pond. The seep sample location is shown on Figure 7-2. The seep sample was collected by direct bottle fill. The seep sample was sent to RECRA and analyzed for TCL volatiles plus Freon 113.

7.4 ANALYTICAL RESULTS

Three water samples were collected from the golf course during the RFA Addendum sampling. The sample results are presented on Table 7-1. One groundwater sample was collected from the potable well supply located at the golf course. One surface water sample was collected from a water trap on the golf course approximately 800-feet south of Swan Pond Road and one seep sample was collected from a location northwest of Swan Pond. No positive detection of VOCs were noted in any of the samples collected.

7.5 FATE AND TRANSPORT

Contaminants were not detected at this site.



APPROXIMATE SCALE 1" = 800'

SAMPLING LOCATIONS**GOLF COURSE****RFA ADDENDUM****NWIRP, CALVERTON, NEW YORK**

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7-4

FIGURE 7-2**C.F. BRAUN
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CTO 0138

7.6 CONCLUSIONS AND RECOMMENDATIONS

1. One goal of the RFA was to assess the potential for any immediate risks to receptors at the golf course. Based on the data collected, there appears to be no immediate threat.
2. Chemicals were not detected in the surface water or groundwater in this area.
3. Based on these findings, no immediate action is recommended for this area under the IR program.
4. The irrigation well water should be tested as part of the future offsite activities. The Navy does recognize and accept the need to identify how far offsite the chloroethane contamination has migrated. However, this was not one of the goals of the RFA Addendum. The additional work that is necessary will be accomplished as part of subsequent work conducted at Site 2 under an upcoming RFI.

TABLE 7-1

**ANALYTICAL RESULTS - 1995 SAMPLE EVENT
GOLF COURSE
NWIRP CALVERTON, NEW YORK**

Groundwater/Surface Water (ug/l)

Compound	MDL	Action Level	GC-SW01	CG-SW02	CG-GW01
VOCs	NA	NA			

NA - Not Applicable

MDL - Method Detection Limit

Blank - Indicates that the chemical was not detected.

REFERENCES

CF Braun 1995. Final RFA Work Plan Addendum, NWIRP, Calverton, New York, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Prepared by CF Braun Engineering, Contract Number N62472-90-0-1298, Contract Task Order 138, October.

Grumman 1996, Phase II Site Assessment, Area 4, Grumman Aerospace Corporation, Calverton, New York, Prepared by Dvirka and Bartilucci, January.

HNUS (Halliburton NUS) 1993a. Final RCRA Facility Assessment Work Plan, NWIRP, Calverton, New York, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Prepared by Halliburton NUS, Contract Number N62472-90-0-1298, Contract Task Order 0090, January.

HNUS (Halliburton NUS) 1993b. Final RCRA Facility Investigation Work Plan, NWIRP, Calverton, New York, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Prepared by Halliburton NUS, Contract Number N62472-90-0-1298, Contract Task Order 0090, July.

HNUS (Halliburton NUS) 1995a. Final RCRA Facility Assessment Sampling Visit, NWIRP, Calverton, New York, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Prepared by Halliburton NUS, Contract Number N62472-90-0-1298, Contract Task Order 138, March.

HNUS (Halliburton NUS) 1995b. Final RCRA Facility Investigation, NWIRP, Calverton, New York, Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Prepared by Halliburton NUS, Contract Number N62472-90-0-1298, Contract Task Order 138, August.

Natural Resources Management Plan, 1989. Naval Weapons Industrial Reserve Plant, Calverton, New York, Natural Resources Management Plan, December 1989.

New York Public Supply Regulations, 10 NYCRR Part 5. Total Principal Organic Contaminants [POCs] (i.e., includes listed volatile organics) and Unspecified Organic Contaminants [UOCs] not to exceed 100 ug/l total.

TAGM 4046. Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels, Number 4046, New York State Department of Environmental Conservation, January 24, 1994 Revision.